

# Home

An Argus Specialist Publication

**EVERY WEEK:**  
Top 10 charts for  
Spectrum, ZX81, Dragon,  
VIC-20 and Commodore 64

# Computing WEEKLY

38p

No. 33  
Oct 18-24, 1983

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ON THE SINCLAIR SPECTRUM

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SEVEN SOFTWARE  
FOR ORIC 48K

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**THE RING OF DARKNESS**  
FOR THE ORIC

## Software man builds a galactic empire

Software boss Mark Eyles has started writing a book based on the galactic empire he dreamed up for the back of his company's games cassettes.

Mr Eyles, sci-fi fan and a director of Quicksilva, hopes to have it finished by the middle of next year.

The story will take place far into the future in the Falluvian Empire complete with hero, heroine, a friendly drone and evil aliens.

And now Mr Eyles, 26, is looking for names for the characters. He invited Home Computing Weekly readers to send their suggestions to him at Quicksilva.

*continued on page 5*

## Games player turns into a computer

Games players will be able to turn their Vectrex consoles into full-fledged home computers.

Milton Bradley has just previewed a plug-in keyboard which adds 66 keys, 16K of expandable RAM and 20K of ROM.

But John Garner, the company's UK sales manager, said the features of the production unit had not been finally decided.

He said: "We are talking about something which will be out, at *continued on page 5*

COMING SOON . . .

## THE HOBBIT

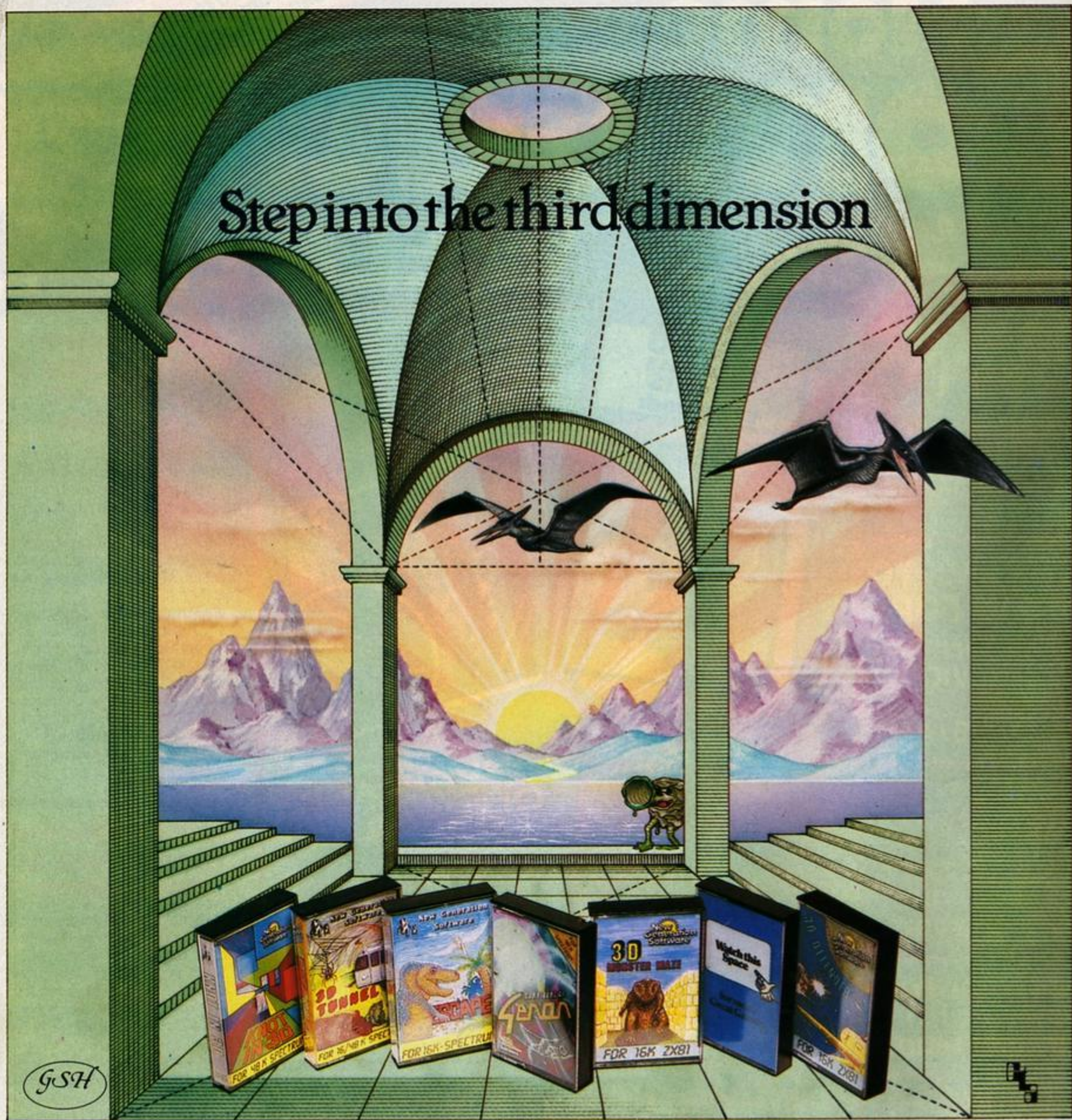
This incredible adventure  
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# Step into the third dimension



Take a giant step closer to reality with New Generation Software. The 3D Graphics of New Generation programs bring the screen alive and makes other games look as flat as snakes and ladders.

Spectrum owners will find that seeing is believing when they open the door on 'THE CORRIDORS OF GENON', the latest creation from New Generation. You will be saving the Universe from the evil that now controls all things. But beware – the sound of footsteps approaching could be Bogul!

Corridors of Genon for 48K Spectrum £5.95  
 Knot in 3D for 48K Spectrum £5.95  
*'The most outstanding thing you'll see for a long time' Popular Computing Weekly*  
 3D Tunnel for 16K/48K Spectrum £5.95  
*'A masterpiece of programming' Computer and Video Games*

Hurtle into a void leaving a trail for your unseen pursuers in 'KNOT IN 3D'. Weave your way through up to five trails but be careful, you could get knotted! Or travel through the depths of a moving tunnel full of bats, rats, spiders and toads in '3D TUNNEL', with a special surprise in the 48K version.

Stamina is the vital ingredient of 'ESCAPE', as you'll be venturing into the maze pursued by walking and flying dinosaurs.

ZX81 owners must be prepared for the

Escape for 16K Spectrum £4.95  
*'One of the best and most original games we have seen for the Spectrum' Sinclair User*  
 3D Monster Maze for 16K ZX81 £4.95  
*'Brilliant, Brilliant, Brilliant...' Popular Computing Weekly*  
 3D Defender for 16K ZX81 £4.95  
*'Another 3D Winner' Sinclair User*

shock of coming face to face with the T. Rex that leaps out from '3D MONSTER MAZE'. '3D DEFENDER' takes you out of this world and plunges you into space in a fast moving game to defend your home planet against alien spacecraft in a blitz of explosions, plasma blasts and photon beams.

All these exciting 3D games have been designed by Malcolm Evans, the 3D expert. They'll have you leaping out of your seat because you don't just play New Generation games, you live them.

**New Generation Software**

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**Briefly**

In Quest Adventure from Hewson for the 48K Spectrum, you take the role of Wizard, Cleric, Rogue, Fighter or Simpleton to try and locate a special map. On the way, you could end up in over 100 locations — and try your luck as well as judgement in combat with gruesome monsters. Quest Adventure has colour graphics as well as rolling screen text, and costs £5.95.

Hewson, 60A St Mary's Street, Wallingford, Oxon OX10 0EL



Looking for something different in software? Applications has just announced two programs that are a little out of the ordinary. Punter's Pal works out the returns from most conventional bets — win or each way — and accounts for Rule 4 deductions, dead heats and co-favourites. £10.50, for Spectrum, BBC and Newbrain. For Spectrum only, there's Denis Through the Drinking Glass, an adventure game with the hapless Denis Thatcher as its hero. Denis must deal with Ken Livingstone, take on the Alliance, and try to find his way out of Keith Joseph's monetarist dreamworld, while keeping out of the clutches of the Iron Lady. All this for £5.50.

Applications, 8 St Paul's Road, Peterborough PE1 3DW



The Wizard is claimed to be the first disc interface for the Colour Genie, and costs £99 from General Northern Microcomputers.

General Northern Microcomputers, 8 Whitworth Road, South West Industrial Estate, Peterlee, Co Durham SR8 2JJ



Use your Spectrum to teach yourself BASIC. The National Extension College has just brought out a Spectrum version of 30 Hour BASIC, which was originally published as part of the BBC computer literacy project. The Spectrum version has most of the features of the original, plus a special section dealing with the Spectrum's colour, sound and graphics.

National Extension College, 18 Brooklands Avenue, Cambridge CB2 2HN

# Home Computing WEEKLY

<b>News</b> .....	<b>5,6</b>
<b>One Man's View</b> .....	<b>6</b>
<b>Oric program</b> .....	<b>10</b>
Have a smashing time	
<b>Software reviews</b> .....	<b>14</b>
Smarter screens with Spectrum and BBC	
<b>Spectrum program</b> .....	<b>19</b>
Will you land on your feet?	
<b>Software reviews</b> .....	<b>21</b>
Adventures for Dragon, TI-99/4A, Spectrum	
<b>ZX81 program</b> .....	<b>23</b>
Work it out without the fuss	
<b>Commodore 64 program</b> .....	<b>24</b>
Only your skill can save your spacecraft	
<b>VIC-20 program</b> .....	<b>27</b>
Order the numbers about	
<b>Software reviews</b> .....	<b>29</b>
Education on Atari, ZX81, Spectrum	
<b>TI-99/4A program</b> .....	<b>31</b>
We're under threat by enemy hordes	
<b>Software reviews</b> .....	<b>35</b>
Action for Spectrum, Atari, Oric, TI-99/4A, Dragon	
<b>Spectrum programming</b> .....	<b>37</b>
How to make flicker-free movies	
<b>Software reviews</b> .....	<b>39</b>
Plane games for Oric, BBC, TI-99/4A, VIC-20	
<b>£1,000 Virgin Games competition</b> .....	<b>41</b>
<b>Profile: New Generation</b> .....	<b>43</b>
<b>Software reviews</b> .....	<b>45</b>
Utilities for Oric, Spectrum, Dragon	
<b>Spectrum program</b> .....	<b>46</b>
<b>Classified ads start on</b> .....	<b>52</b>

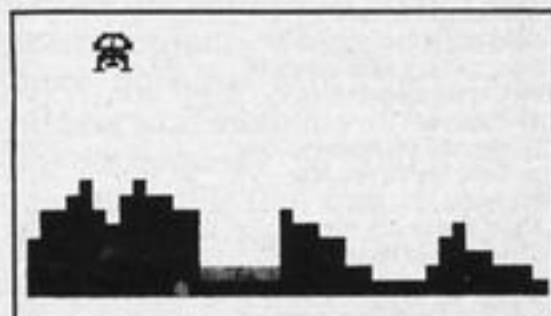
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**SOFTWARE SUPERMARKET**

24 Pages of Spectrum best send 50p stamp to:  
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87 Howards Lane  
SW15 6NU



Gently does it... a scene from the great Commodore 64 game which starts on page 24



Educational programs are reviewed on page 29



Your chance to win a prize package of games in our £1,000 competition — turn to page 41



The mind behind the monsters is revealed on page 43

## BBC Microcomputer System

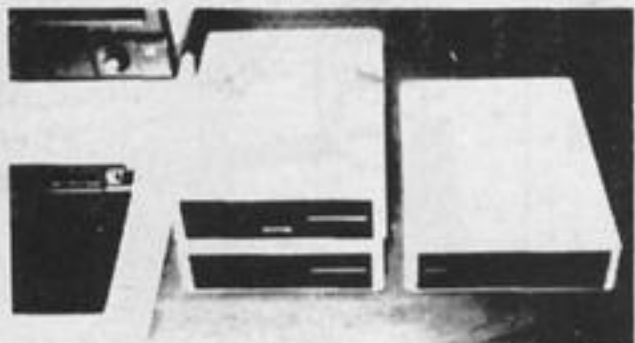
### OFFICIAL BBC COMPUTER DEALER

MODEL A AVAILABLE  
£299 inc. VAT

This is the best microcomputer currently on the market. 32K RAM, 32K ROM, 8 modes of operation, full colour, full-size keyboard, internal expansions such as disc interface, speech synthesizer, Econet interface - In short, it is a personal computer capable of expanding into a small business system.

BBC Microcomputer Model B	£348 + VAT	£399.00
BBC Mod B - disk interface	£409 + VAT	£469.00
BBC Mod B - Econet interface	£389 + VAT	£447.35
BBC Mod B - disk and Econet interfaces	£450 + VAT	£517.50
BBC 100K disk drive	£230 + VAT	£264.00
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Torch Z80 disk pack including Z80 2nd processor, 64K RAM and CPN operating system + free perfect software	£699 + VAT	£803.85
BBC Teletext receiver (Aug)	£196 + VAT	£225.40
BBC cassette recorder and lead	£26 + VAT	£29.90
Disk interface kit (free fitting)	£86 + VAT	£96.60
Mod A to Mod B upgrade kit	£50 + VAT	£57.50
Fitting charge for A to B upgrade kit	£20 + VAT	£23.00
16K memory upgrade kit	£20 + VAT	£23.00
Games paddles	£11 + VAT	£12.65
12" Monochrome monitor incl. cable	£89 + VAT	£102.35
16" Colour monitor incl. cable	£239 + VAT	£274.85
User guide	£10 + VAT	£10.00
Econet interface (free fitting)	£60 + VAT	£69.00
Speech interface (free fitting)	£47 + VAT	£54.05
BBC disk manual - formatting disk	£30 + VAT	£34.50
Parallel printer cable	£10 + VAT	£11.50
BBC word processor (view)	£52 + VAT	£59.80
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BBC Lisp language cassette	£15 + VAT	£17.25

## 100% BBC COMPATIBLE MITSUBISHI AND TEAC SLIMLINE DISK DRIVES



These drives are supplied ready cased with all the necessary cables, formatting program and user disk system guide.

There are some useful utilities included, e.g. Epson Screen Dump Program, Memory Dump, Free Duplicate, Merge and Relocate. Power consumption of these drives is very low (0.2A typ. at 12V, 0.4V typ. at 5V per drive). Power is taken from the BBC computer.

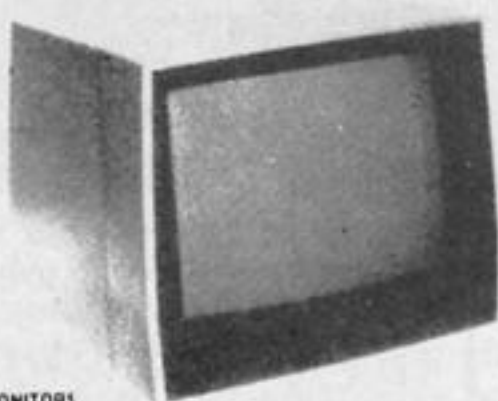
Single drive 100K 40 tracks	£169 + VAT	£194.35
Dual drive 200K 40 tracks	£329 + VAT	£378.35
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Single drive 400K 40 80 tracks switchable	£259 + VAT	£297.85
Dual drive 800K 80 tracks	£449 + VAT	£516.35
Dual drive 800K 40 80 tracks switchable	£469 + VAT	£539.35

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This package consists of BBC Microcomputer, View wordprocessor, 400K Slimline disc drive, High resolution 12" Green monitor, Juki 6100 18CPS Daisy Wheel printer and all the necessary cables and documentation. The above package can be supplied with components of your own choice, e.g. 800K disc drive or a different printer. Please phone us for a price for your particular requirement.

Special package deal £1,099 + VAT = £1,263.85

## PROFESSIONAL MONITORS



### GREEN MONITORS

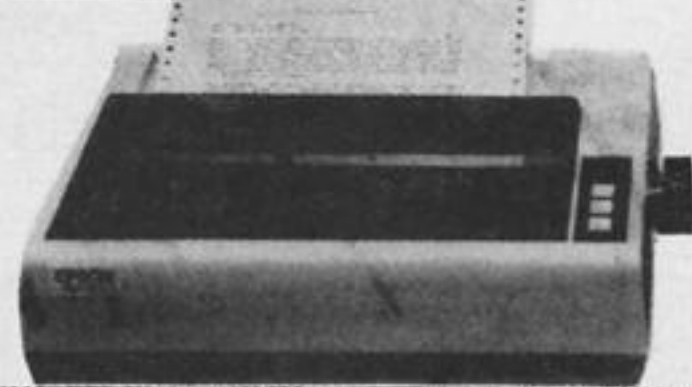
12" Green screen monitors with composite and sync input. Suitable for most computers.

18 MHz band width, high resolution	£89 + VAT	£102.35
15 MHz band width, normal resolution	£69 + VAT	£79.35

### COLOUR MONITORS

MICROVITEC RGB input 14" - monitor supplied with RGB lead for BBC	£209 + VAT	£240.35
SANYO SCM 14" Normal res. 14" 400 dots. RGB input supplied with RGB lead	£719 + VAT	£821.85
SANYO SCM 14M Medium res. 14" 600 dots. RGB input supplied with RGB lead	£199 + VAT	£228.85
SANYO SCM 14H High res. 14" 800 dots. RGB input supplied with RGB lead	£399 + VAT	£458.85

## EPSON FOR RELIABILITY



**EPSON FX80:** 80 column, 160 CPS, normal, italic and elite characters, 256 user definable characters, superscript, subscript, 11 x 9 matrix, bi-directional logic seeking, hi-res bit image printing (960 x 8 dots-line), friction and pinfeed, 9 international character sets, Centronic parallel interface.

FX80 PRICE £349 + VAT = £401.35

**EPSON RX80:** 80 column, 100 CPS, normal, italic and elite characters, 11 international character sets, hi-res bit image printing, bi-directional logic seeking, 4" to 10" adjustable pin feed, Centronic parallel interface.

RX80 PRICE £239 + VAT = £274.85

**EPSON FX 100:** 136 column, 160 CPS friction and tractor feed, up to 15" adjustable carriage, hi-res bit image printing, true descenders. PRICE £479 + VAT = £550.85

RS232 Interface for all above printers £55 + VAT = £63.25

RX80 FT (friction tractor) £269 + VAT = £309.35

Tractor feed for FX80 £79 + VAT = £90.85

Roll holder for FX80 £12 + VAT = £13.80

Ribbon for MX80, FX80, RX80 £8 + VAT = £9.20

Ribbon for MX100 £12 + VAT = £13.80

## SEIKOSHA DOT MATRIX PRINTERS WITH HIGH-RES GRAPHICS



**GP-100A:** 80 column, 50 CPS, dot addressable hi-res graphics, 10" wide, fully adjustable, tractor feed, 7 x 5 print matrix, Centronic parallel interface.

GP-100A 50CPS PRICE £175 + VAT = £201.25

**GP-250X:** 80 column, 50 CPS, 10" wide, fully adjustable, tractor feed, true descenders, 64 user definable characters, double height and or double width printing, 8 x 5 print matrix, Centronic parallel and RS232 (serial) interfaces both included.

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### NEW GP-700A 7 COLOUR PRINTER

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STAR DPS10 10" carriage 80 columns £219 + VAT = £251.85

SPECIAL PRICE

STAR DPS15 15" carriage 136 columns £279 + VAT = £320.85

SPECIAL PRICE

RS232 INTERFACE FOR ABOVE £50 + VAT = £57.50

## POCKET COMPUTERS AND CALCULATORS

\* CASIO PB-100 Basic language pocket computer, 544 program steps, Qwerty keyboard, 12 char display £34.75 + VAT = £39.95

\* CASIO FX-700P Basic language, scientific functions, 1568 program steps, Qwerty keyboard, 12 char display £43.44 + VAT = £49.95

\* CASIO PB-300 Basic language computer, scientific functions, 1568 program steps, built-in mini printer, Qwerty keyboard, rechargeable batteries and charger, 12 char display £78.22 + VAT = £89.95

\* CASIO FA-3 Cassette adaptor for PB100, PB300, FX700 £17.35 + VAT = £19.95

\* CASIO FP-12 Printer for BB100 and FX700 £39.09 + VAT = £44.95

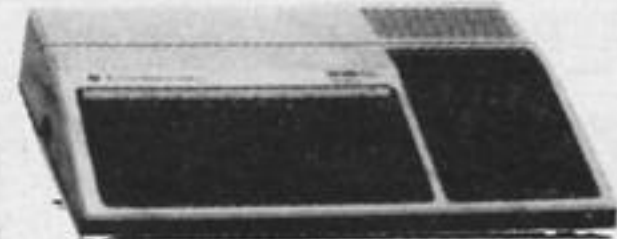
\* SHARP PC-1211 Basic language computer, scientific functions, 1424 program steps, 24 char display, Qwerty keyboard £60.83 + VAT = £69.95

\* SHARP PC-1251 Basic language computer, 4K RAM, 24K system ROM, 24 char display, Qwerty keyboard, user defined key, numeric pad £69.52 + VAT = £79.95

\* SHARP CE-125 Cassette recorder and mini printer for use with PC-1251, incl. ball charger £86.91 + VAT = £99.95

\* SPECIAL PRICE PC-1251 - CE-125 £146.95 + VAT = £169.00

## TEXAS INSTRUMENTS TI 99/4A



This microcomputer is based on TMS9900 16-bit microprocessor. It includes 16K RAM, 16 colour high resolution graphic (192 x 256). The screen display is 32 characters, 24 lines TI-BASIC. Full-size keyboard. For Software there are about 1000 programs to choose from. There are a lot of peripherals available, e.g. Disk Drives, Disk Interface, Speech Synthesizer, Extra RAM. Additional Language (PASCAL, TI-LOGO, ASSEMBLER).

### TI HOME COMPUTER HARDWARE

Title	Description	Price inc VAT
T199-4A	Complete with UHF modulator and power supply	£99.95
<b>PERIPHERALS</b>		
Speech Synthesizer	When used with selected modules will reduce electronic speech	£41.95
Peripheral Expansion System	This unit takes all card peripherals and on internal disk drive	£79.95
Disk Drive - Internal	92K formatted drive, mounts internally in peripheral expansion system	£149.95
Disk Controller Card	Controls up to 3 disk drives, complete with disk manager command module	£109.95
Disk Drive Double Sided	92K formatted capacity per side acts as 2 drives DSK1 & DSK2 total capacity 184K bytes	£219.95
Disk Drive External	Complete with own case, power supply & connecting cables	£259.95
RS232 Expansion Card	Provides 2 serial RS232 ports, and one parallel port for interfacing	£79.95
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Matrix Printer GP250X	80 column matrix printer with RS232 and Centronic parallel interface	£273.95
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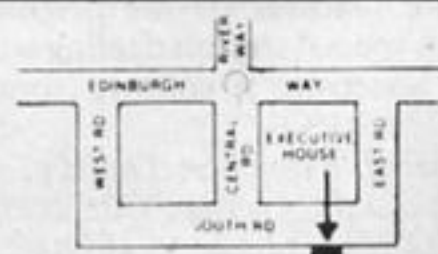
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The Vectrex games player sitting on top of the prototype keyboard which turns it into a computer

## Vectrex

From front page

the earliest, by the middle of next year. The market is changing so quickly and it is the marketplace which will dictate what we offer."

The Vectrex games player, costing £130, has a 9in upright monochrome screen and a detachable joystick unit with fire buttons.

The prototype keyboard is designed so the games unit stands on top. Although a price has not been decided, it would have to be competitive with complete home computers.

Milton Bradley says its Vectrex monitor gives a sharper, faster moving image, using less computing power because it uses the vector scan technique instead of the raster scan used by domestic TVs.

Raster scan refreshes the whole screen every one-fiftieth of a second. Vector scan creates only the image required — building it up with lines — without scanning the whole screen.

Vectrex accepts only cartridges and there are also screen overlays to add colour.

The keyboard unit will control

a 40 by 25 display. Also promised is an extended BASIC, full screen editor, user-definable function keys using a functions key and the numerals, three-channel sound over five octaves with sound, envelope and noise commands.

It uses a 6809 processor, like the Dragon.

Program authors will have to buy a license for detailed information — a move which, says the company, is to protect its novel ideas, built-in.

There will be a stringy floppy, RS-232 port, memory expansion slot, cartridge slot but no cassette recorder port.

The computer system will run all Vectrex games plus the new 3D viewer and light pen.

The 3D viewer, which will cost £40-£50, is a pair of goggles with a broad head-band. In front of the user's nose is a spinning coloured disc, drive by a tiny motor. When viewing a flickering screen this gives an effective 3D image in colour.

The light pen, priced at £20-£30, has software to allow line dragging animation and overlays of previous frames.

Both peripherals come with a free cartridge. Vectrex cartridges usually cost £19-£28.

Milton Bradley, CP House, 97/107 Uxbridge Road, Ealing W5 5TZ

## Empire

From front page

The empire theme has been continued on the cassette inlays and advertisements, most notably for Timegate where the player is a sort of merchant adventurer of space.

My Eyles said: "I've always wanted to write but it's only since I've been with Quicksilva that I've got my inspiration... from the games.

"I haven't thought of a name for the book yet but it will be a cross between science fiction and games — a sort of games fiction."

His favourite sci-fi authors are people like Brian Aldiss, Michael Moorcroft and Thomas Pynchon because they can turn their hands to other forms of fiction as well.

He had planned to take time off each week in the summer to make a start, but was too busy.

So now he has set up a typewriter and desk in a quiet corner at home and is determined to spend a few hours a week. So far he has mapped out the time sequence of the book.

He said: "Your call will stop me putting it off. It will give me

that kick up the backside to keep me going. I don't want it to drag on any longer than the first half of next year or I'll lose interest.

"After that I've got plans for other books — non-fiction, short stories and a novel. I've got enough ideas to keep me going."

● A Quicksilva customer has complained to the Advertising Standards Authority about an advertisement which offered: "Free universe with every tape (subject to availability)." An ASA spokesman said: "We did receive a complaint of that nature which the authority, having considered it, decided not to pursue."

Quicksilva, 13 Palmerston Road, Southampton, Hants SO1 1LL

## £200 colour monitor

Fidelity's first computer-related product is a 14-inch colour monitor costing just under £200. Called the CMI4, it's designed to work with virtually any computer or games machine.

Fidelity, Victoria Road, London NW10 6ND

# You could be on our pages

We welcome programs articles and tips from our readers.

**PROGRAMS** should, if possible, be computer printed to a width of 48 characters (use a new ribbon) and/or sent on cassette. Check carefully that they are bug-free. Include details of what your program does, how it works, variables you have used and hints on conversion.

**ARTICLES** on using home computers should be no longer than 2,000 words. Don't worry about your writing ability — just try to keep to the style in HCW. Articles most likely to be published will help our readers make better use of their micros by giving useful ideas, possibly with programming examples. We will convert any sketched illustrations into finished artwork.

**TIPS** are short articles, and brief programming routines which we can put together with others. Your hints can aid other computer users.

Competitive rates are paid.

Keep a copy of your submissions and include an SAE if you want them returned. Label everything clearly and give a daytime and home phone number if you can.

Paul Liptrot, Home Computing Weekly, 145 Charing Cross Road, London WC2H 0EE



Adrian Hedley and Jo Wheeler will present Central TV's Magic Micro Mission

## A mission to demystify the micro

Central TV is jumping on the home computer bandwagon with The Magic Micro Mission, a new TV series that will emphasise home computer games.

Magic Micro Mission will, Central says, explore what's happening in computer technology today as well as looking ahead to future developments, and is pledged to demystify the computer world — for example, by explaining computer terms like ROM and RAM.

Each week, a panel of five children will try out a range of hardware and software.

Presenting the show are Jo Wheeler and Adrian Hedley, plus resident expert John Barker of Warwick University, and they

will be joined each week by a number of well-known names.

The first programme will feature Dave Lee Travis and Patrick Bossert of Rubik's Cube fame, plus Willy Rushton and Chris Sievey. Peter Choy of The Chinese Detective, whose hobby is making Lego robots controlled by his Spectrum, will make a guest appearance on the second programme. And Rick Wakeman will appear on the third.

If you live in the East of West Midlands, you'll be able to tune into the half-hour programme at 5.15 every Wednesday from 9 November. The series will run for six weeks, and may be repeated before Christmas. Central is hoping that other TV regions will screen it too.

Central TV, Central House, Broad Street, Birmingham B1 2JP

## New club for TI owners

TI owners now have a national users group, which takes over from the old TIhome.

Called the TI Home Computer Users Club, it aims to offer the same benefits as TIhome, but at a reduced fee of £5 per year instead of £12.

This reduction in fees will be possible because the new club, run by Ray Hodges of Hodges Associates, is aiming at mass membership. TI has given the club access to its own mailing list, and will be putting club information in with all new TI-99/4As sold.

In addition, TI will be supporting the club with new product information and technical advice, "though not financially", according to TI's Robin Frowd. "It's not going to be a mouthpiece for TI".

For their £5, members receive a membership card, a quarterly magazine and details of local TI user groups.

They will also have access to the TIhome software library, which offers a mail order service for software from all over the world, as well as books and listings.

Paul Dicks, who set up TIhome, will continue to be involved with the new club, running the software library and contributing to the magazine.

Ray Hodges, the new organiser, is no stranger to organising clubs — she set up the first Atari VCS users group in the UK. She will have full-time staff who can answer membership queries on the spot, and get answers to technical queries. Members can ring the club on 0628 71696.

TI Home Computer Users Club, PO Box 190, Maidenhead, Berks SL6 1YX

# Why programs need a seal of approval

*Microcomputers, we are constantly being told, will bring about a revolution in the classroom.*

*A prerequisite of this revolution will be the ready availability of top quality software, fully documented and error trapped and free from bugs.*

*Anyone who takes the trouble to read the software reviews in this and other magazines will know that there is not, at present, a great deal of educational software available, and a good proportion of what there is at best of dubious educational benefit.*

*In the short time I have been involved in software retailing, it has become transparently clear to me that parents of children who use micros at school or at home are crying out for some decent software to lure their children away from Space Invaders and the like.*

*At the moment there is no way for them to check the quality of the software that they are thinking of buying (unless they cut out all the reviews and file them away for future reference).*

*It would therefore seem like a very good idea to have some sort of universal standard by which educational software can be measured.*

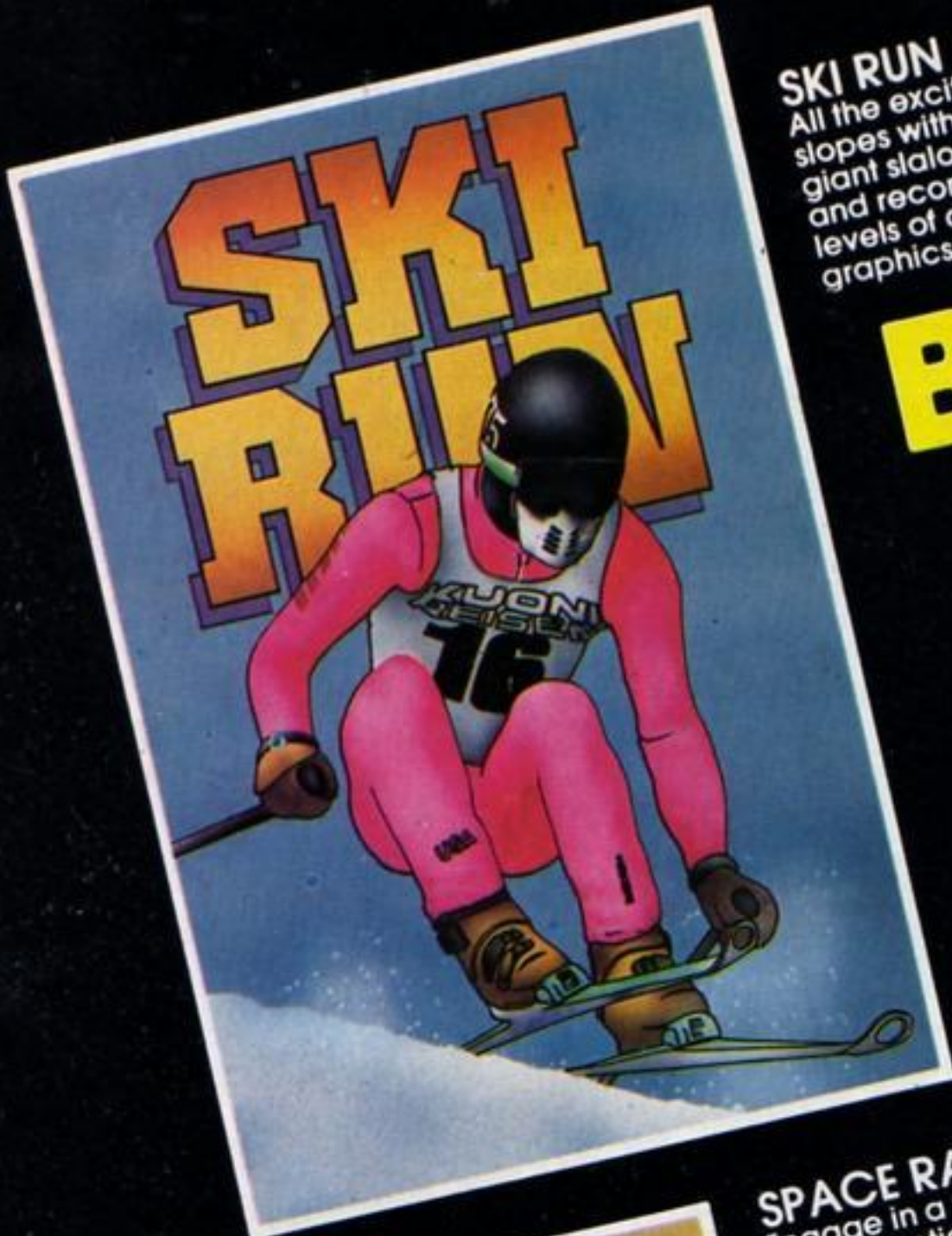
*Having given the subject a great deal of thought I have come up with the following ideas:*

- 1 That representatives of the microcomputing industry (particularly from the software side) approach the Department of education with a view to setting up a joint panel of teachers and programmers to identify the areas in which microcomputers can be most beneficial.*
- 2 Having identified those areas, produce a set of guidelines for aspiring software authors in order to achieve some uniformity of presentation.*
- 3 Anyone wanting their software to carry Department of Education approval would have to submit their programs to the panel and carry out any changes that the panel decide are necessary. Then, and only then, would authors be allowed to advertise their programs as "approved educational software."*

*It is my belief that the availability of software carrying such approval would encourage parents who are contemplating buying their children a micro to go ahead with the purchase, secure in the knowledge that it will help them to learn as well as giving them many hours of entertainment.*

*Obviously a great deal of discussion would need to take place before my ideas could be put in to practice but it is essential that some sort of debate should start now if our children are to reap the rewards that the microcomputer offers.*

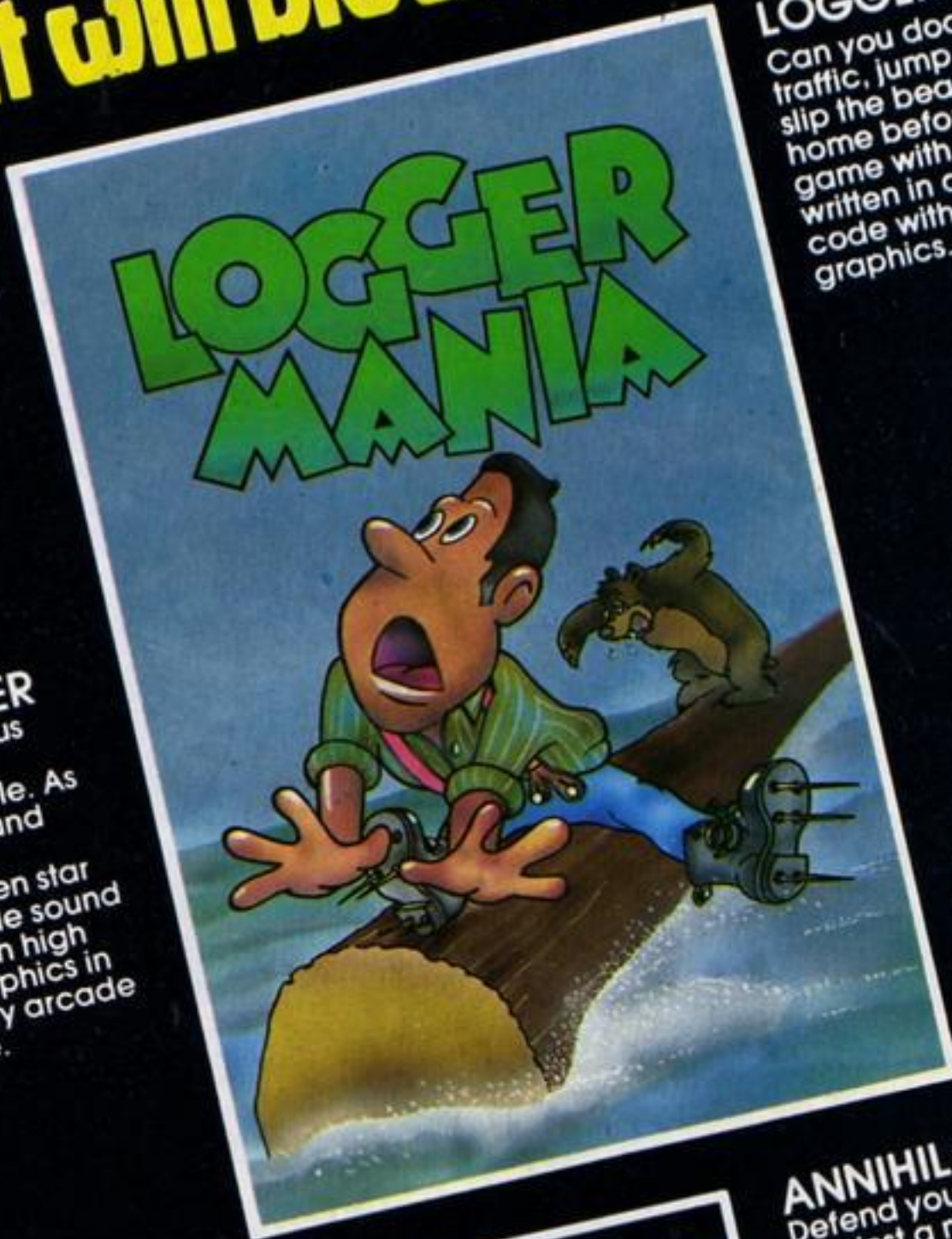
**Graham Barrow**  
Partner, Sheensoft Software,  
Richmond,  
Surrey



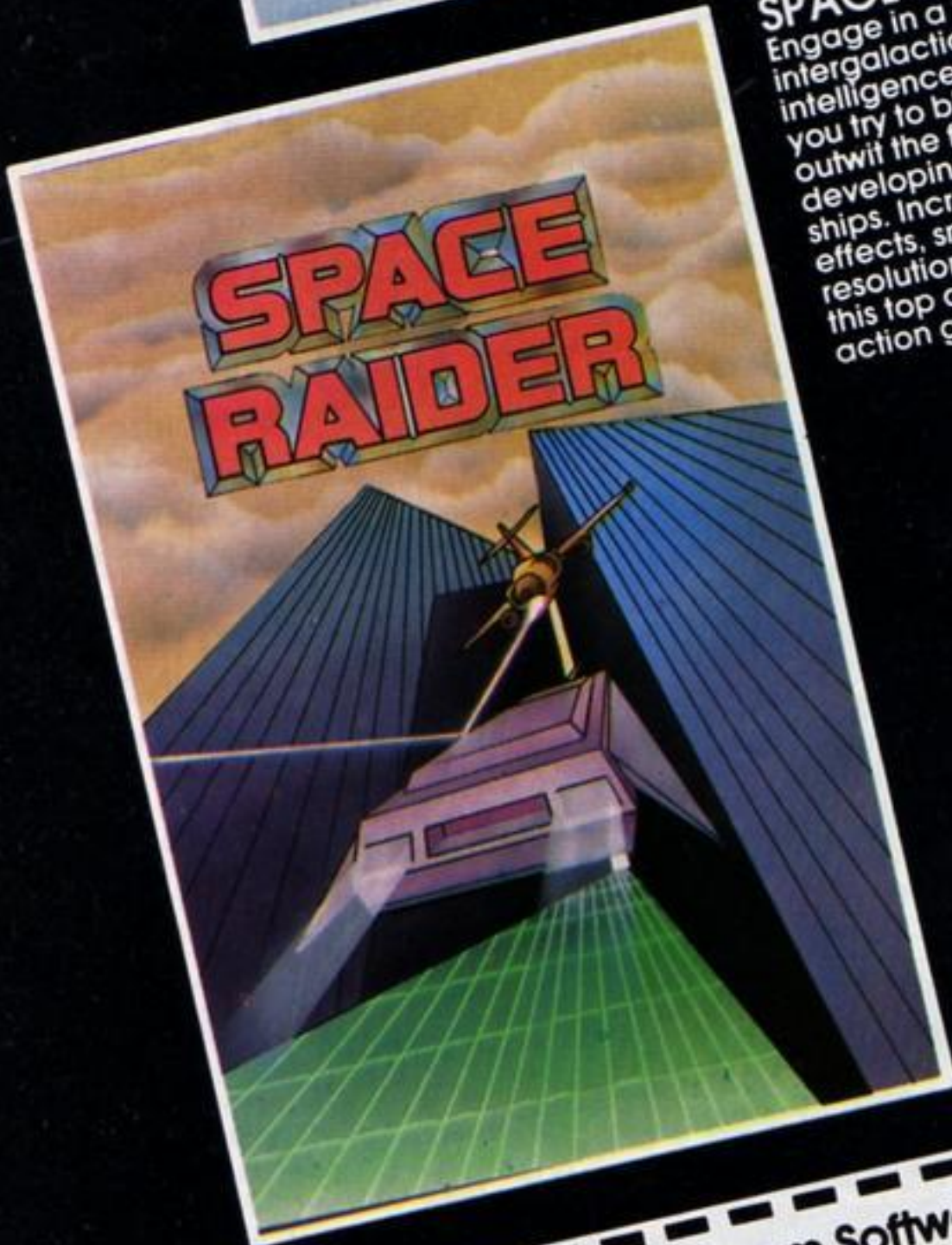
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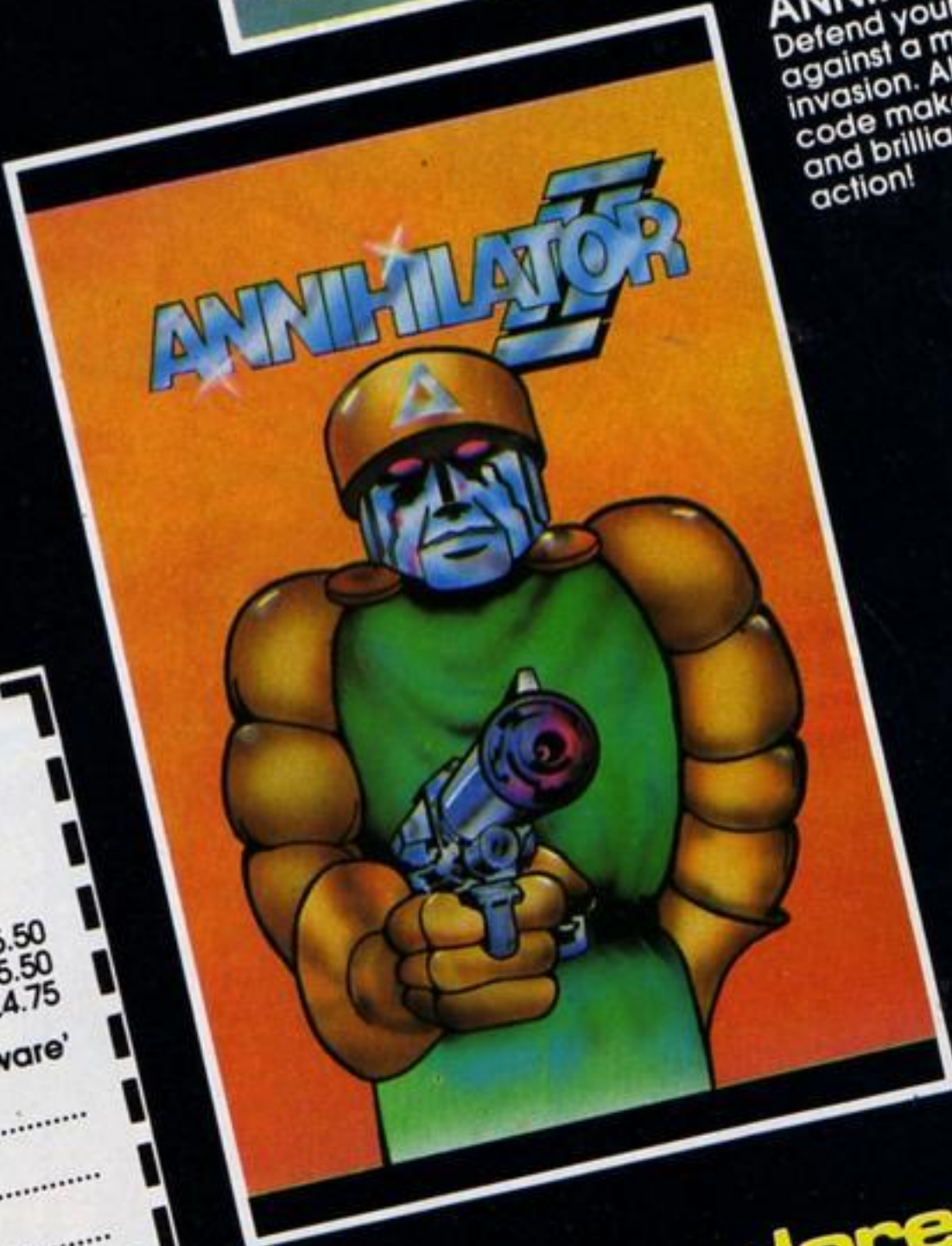
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**Quick reactions and good destructive planning are needed to play David Nowotnik's game for either mode of the Oric**

# Crash!

**How good are you at destruction?**



In several respects Demolition is an ideal game. It is very simple to play; a single keypress (any key) is all that is required by the player, so it can be enjoyed by games players of all ages.

However, for a high score you will need good reactions, and a logical plan of destruction!

Demolition has been described as a Breakout clone, but once you have played both games you should appreciate that they are quite different.

In Demolition a wall appears at the base of the screen. As in Breakout, the object is to knock bricks from the wall. This is done by firing an object — in this case an asterisk — at the wall.

The asterisk will bounce back and forth across the top of the screen until you press a key, at which point it will fall, and knock out the first brick in its path.

That may sound simple, but as you play the game you will soon

realise that you can remove more than one brick at a time.

As with a pile of tins in a supermarket, if you can remove a brick lower down in the wall, then bricks diagonally above that brick will also fall down.

You get as many asterisks as you need, time is the limiting factor with this game, so you need a good strategy and accuracy in aiming the asterisk to achieve a high score.

The wall will rise up the screen,

**How it works**

10-170 POKE in user defined graphics, and initialise certain variables  
 180-230 PRINT title and instructions request  
 240-280 PRINT wall and greater than symbol as marker  
 310-370 move asterisk across the screen, and check for a keypress  
 380-400 bounce asterisk when the edge of screen is reached  
 500-570 move asterisk down screen, check for a brick and bottom of the screen  
 600-740 remove bricks, increment score  
 750-790 decrement scroll counter — if 0, move wall up one. 780 checks if new row of bricks should be printed  
 800-840 check if upward movement of wall means end of game  
 1000-1030 subroutine to increment score and 'brick hit' sound  
 1500 end of game message  
 5000 instructions

**Main variables**

DS,DHS,ES,HMS,SRS cursor control and double height control  
 WLS prints a row of bricks  
 HS high score variable  
 SC game score  
 NM,TM counters, used in scrolling wall  
 VE,HO plot positions of asterisk  
 LH,RH used in demolition of wall  
 M horizontal direction of asterisk  
 SZ a counter used to determine whether a new row of bricks should be printed

slowly at first, then more rapidly as the game progresses.

When any brick reaches the level of the marker — the greater than symbol at the top left of the screen — the game is over. It is possible to remove all the bricks in the wall, but more walls will appear, so you can never beat the computer.

I used this game as the main attraction on a stand at a local fete this summer. The highest score achieved on the day was just over 600, with one point for every brick removed.

Can you beat that?



# JUST AROUND THE CORNER, A NEW

## BLACK CRYSTAL



### BLACK CRYSTAL

The Classic, six program adventure game for the 48K Spectrum and 16K ZX81 computers. No software collection is complete without it. **Black Crystal** is an excellent graphics adventure and a well thought out package. *Sinclair User, April '83* **Black Crystal** has impressed me by its sheer quantity and generally high quality of presentation. I am afraid I have become an addict. *Home Computing Weekly, April '83*  
**Spectrum 48K** 180K of program in six parts only **£7.50**  
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Available now for the 48K Spectrum at **£4.95**



### THE ADVENTURES OF ST. BERNARD

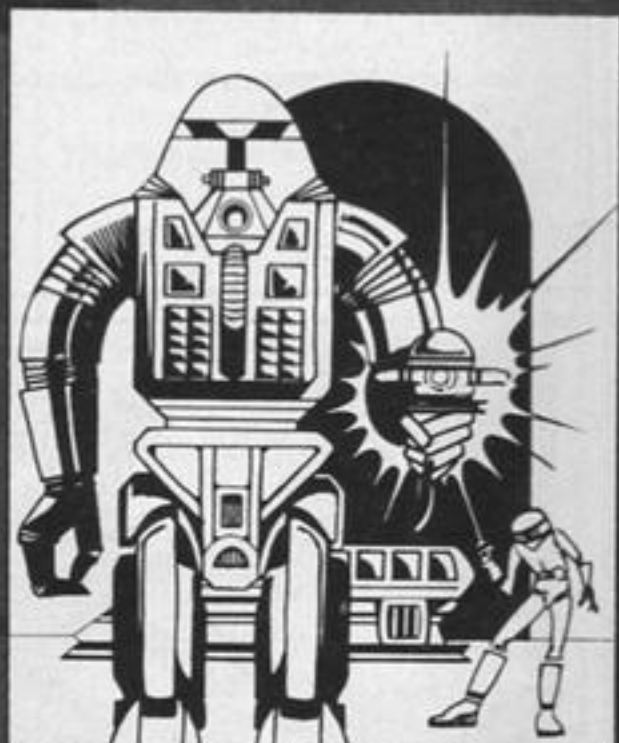
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Alien Intruder/Hieroglyphics — Both programs make good use of graphics and words to make a very entertaining package. *Sinclair User Aug 82* Alien/Hieroglyphics/Wumpus/Movie — A varied mix from Carnell, all featuring imaginative responses and graphics and all of them good games for all ages (Hieroglyphics is particularly good for children). *Popular Computing Weekly Aug 82*

### THE DEVIL RIDES IN

I uttered the last incantations as the clock struck thirteen. All fell silent except for a faint rustling in the corner. From out of the shadows they came, all Hell's fury against me but I was not defenseless until the Angel of Death, astride a winged horse, joined the battle. Avoiding his bolts of hell fire, I took careful aim. My chances were slim, but if my luck held...

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"The Wrath of Magra" comes as three, 48K programmes on cassette, boxed with instruction manual and book detailing the history of the Third Continent and the many spells you will be using throughout the game.

**NOTE:** "The Wrath of Magra" is a complete adventure. You need not buy "Volcanic Dungeon" or "Black Crystal" to play it.



CARNELL SOFTWARE LTD

## SOFTWARE REVIEWS

### 3D Graphics Spectrum £5.95

Emsoft, 37 Lennox Drive, Wakefield, West Yorks

The title is a little misleading. Any unsuspecting buyer looking for deep space effects for their current games program will be disappointed. It is intended for serious use in drawing three-dimensional shapes and examining them from all angles.

The instructions are technical but can be followed by the novice with a little effort. Unfortunately, the example data shown on the last page seems to be in error, as it does not produce the figure shown.

An inbuilt facility to change paper and border colour seems superfluous in a program of this nature.

Objects drawn can be enlarged

on reduced. The data or figure can be dumped to printer from within the program, or data may be saved to tape.

The object can be rotated through all three axes and degree of rotation can be specified. It is displayed with simulated perspective, and all drawn lines are visible at any angle, which is sometimes confusing.

The cassette contains four programs, for 16K, 48K and two external input devices. The 48K version had a fast rotation replay of the last 15 angles displayed. Overall, I found the response time extremely slow.

D.C.

instructions	75%
ease of use	75%
display	60%
value for money	95%



### Beeb-Art BBC B £14.95

Quicksilva, 13 Palmerston Road, Southampton SO1 1LL

As the title suggests, Beeb-Art is designed for artwork and particularly for artists using joysticks.

For speedy colour painting it is

easier to use than some graphics programs, but as a general graphics package for users requiring a wide range of graphical effects, its options are very limited.

Impressive pictures can be painted but it is time-consuming and difficult without joysticks. The ability to erase and change colour by one key entry gives an advantage over brush and paint,

but lack of tone and shade give finished paintings a 'painting by numbers' appearance and the cursor is difficult to position without joysticks.

Fixed width brush, single cursor speed, only one mode, no text and poor use of function keys make it an unimaginative package.

In fact, apart from the circle drawing option, the keys f0 to f8 give options which are rather pointless and are far too inflexi-

ble to be of much use except for filling large areas with colour.

The presentation of the tape is excellent, but the instruction book could have been better structured.

J.D.

instructions	60%
ease of use	85%
display	85%
value for money	40%



### Multifont Spectrum £5

Image Systems, 185 Elm Road, New Malden, Surrey KT3 3HX

This cassette holds six different type fonts which are easily loaded above RAMTOP. Full instructions on LOADING and accessing the fonts are given in the accompanying folder.

The fonts occupy either 472 or 768 bytes and so leave quite a bit of room for the rest of the program.

The fonts are these:

**Extended Bold:** This is a complete set of bolder than usual characters with true descenders. The problem is, these descenders merge with some ascenders on the line below.

**Modern:** Only capitals, numbers and symbols to code 90 are available, lower case letters printing as garbage. (This restric-

tion also applies to the next 3 fonts.)

The 7 is top heavy, the M has a thin middle, and the X appears to have a broken leg!

The instructions indicate that @ is redefined as £. This was not so on the review copy.

**Serif:** This is a clear, easy-to-read set with a classical feel.

**Lodestone:** The numbers (similar to those on cheques) are quite attractive but the capitals are rather odd.

The M & N have a dot between the ascenders and the X appears to have boots on!

**Standard Bold:** A heavy set with a strange K, M, W & K.

**Greek:** Nice looking but of questionable use.

C.B.

instructions	95%
ease of use	85%
display	65%
value for money	45%



### Melbourne Draw 48K Spectrum £8.95

Melbourne House, 131 Trafalgar Road, London SE10

A carefully-written 22-page manual explaining how to use this program to create high resolution colour pictures on the Spectrum.

And to show you what can be achieved using the program, the title pages of three popular Melbourne House games also appear on the tape as examples.

The program not only allows you to draw impressive title pages, but can be used to create UDGs, background scenes for games, and specialist drawings such as circuit diagrams.

These are created through the various facilities offered by the

program. Drawings are achieved by moving a pixel cursor in one of eight directions; attributes are set separately.

To help, areas of the screen may be magnified up to 16 times.

Other aids include grids placed on the screen, bit scroll in four directions, and normal size text and UDGs placed on the screen.

When complete, your drawing can be saved on tape and verified under program control.

On the negative side, there are no facilities to draw curves, and no easy method to create enlarged text, or to turn letters on their sides.

D.N.

instructions	90%
ease of use	50%
display	80%
value for money	70%



### Easy Graphics BBC B £13.50

Hexagon Software, 17 Straits Rd, Gornal, Dudley DY3 2UR

Easy Graphics will give the user both enjoyment and a very valuable drawing aid.

Loading is straightforward and comprises three programs: a really impressive demonstration program, the main draw pro-

gram and redraw which enables saved pictures to be reloaded. All screen displays can be incorporated into existing programs.

Most of the usual features are available; line drawing, fill, circles, colour changes, rubber banding, grids, xy coordinates, modes 0 to 5, etc, but many of these options have added features which give far more flexibility than is usually found in programs in this price range. One very powerful feature is a

repeat command (shades of turtle graphics) which enables any shape or effect to be repeated anywhere on the screen.

Many of the PLOT statements can be used and screen layouts can be built up and replayed in sequence which should prove a powerful option for users wanting to build up sequential instructional diagrams.

The screen layout and instructions are clear but a continual readout of xy coordinates would

have been preferable to sampling.

The user manual is very easy to understand and all program options are accessed by single or CTRL key inputs.

J.H.D.

instructions	90%
ease of use	80%
display	80%
value for money	95%



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# Do you think you can fall on your feet?

Imagine that you're a paratrooper about to be parachuted into enemy territory.

As you stand in the open door of the plane, about to jump, you see far below your goal — a small landing pad in the middle of a treacherous minefield.

To land on the minefield means instant death — and there are strong cross winds which could easily blow you off course.

Will you dare to jump?

### How it works

- 5-7 offer instructions
- 15 set up variables for banner plane
- 20-97 set up user defined graphics
- 100-120 set up main variables
- 130-195 set up screen display
- 210-250 move plane
- 240 check for 0 to be pressed
- 300-390 draw and move sky diver in freefall position. 350 check for 9 to be pressed, 360 check for impact with ground
- 400-407 check for disaster
- 410-500 main parachutist loop
- 610 check for safe landing
- 619-627 explosion in minefield routine
- 628-645 score routine
- 700-760 increase and display score
- 800-850 end of game
- 900-970 banner plane routine
- 990-999 instructions

**You may be able to fly through the air with the greatest of ease, but how are you at coming down to earth? You'll find out when you play John Shipman's sky diver game for any Spectrum**

- User defined graphics**  
 There are 17 graphics overall, so I have listed them all here.
- a flag with no wind
  - b flag with full wind from the left
  - c flag with full wind from the right
  - d flag with half wind from the left
  - e flag with half wind from the right
  - f front of the plane
  - g middle of the plane
  - h tail of plane
  - i free falling parachutist
  - j parachute
  - k parachutist
  - L stem of explosion
  - M top, left of explosion
  - N top, middle of explosion
  - O top, right of explosion
  - P bottom, left of explosion
  - Q bottom, middle of explosion
  - R bottom, right of explosion

```

2 PAPER 5: BORDER 1: CLS
5 INPUT "DO YOU WANT INSTRUCTIONS (y/n)"; a$
7 IF a$="y" THEN GO TO 330
15 RANDOMIZE : LET n=0: LET p=0: LET w=32
20 LET a=65368
30 FOR b=a TO 65511
40 READ c: POKE b,c: NEXT b
50 DATA 0,224,224,224,224,224,64,64
55 DATA 0,124,125,124,54,54,54,64
60 DATA 0,62,125,52,2,2,2,2,64
63 DATA 0,112,124,127,79,67,64,64
66 DATA 0,14,62,254,242,194,2,2
70 DATA 0,15,19,19,127,255,127
    
```



```

73 DATA 0,128,252,255,85,255,255,248
76 DATA 3,7,15,255,255,254,252
80 DATA 0,1,195,195,102,125,12
0,32
85 DATA 60,126,255,255,255,255,66,129,153,219,126,50,24,125,102,195
90 DATA 129,66,66,36,36,36,66,129
92 DATA 0,0,7,8,115,134,135,128
93 DATA 60,65,129,0,128,64,32,0
94 DATA 0,0,224,16,14,1,225,17
95 DATA 128,128,129,102,8,7,0,0
96 DATA 2,224,16,8,0,129,66,60
97 DATA 9,1,1,14,16,224,0,0
100 LET alt=1: LET l=5: LET q=0
110 LET d=INT (RND*2)
120 LET s=INT (RND*3)
130 IF s=0 THEN PRINT AT 20,7; INK 1;"A"
140 IF d=0 THEN LET d=-1
150 IF s=1 AND d>0 THEN PRINT AT 20,7; INK 1;"D"
160 IF s=2 AND d>0 THEN PRINT AT 20,7; INK 1;"B"
170 IF s=1 AND d<0 THEN PRINT AT 20,7; INK 1;"E"
180 IF s=2 AND d<0 THEN PRINT AT 20,7; INK 1;"C"
182 FOR a=0 TO 31
183 PAPER 5
185 PRINT AT 21,a; INK 4;"="
186 NEXT a
190 PRINT AT 21,14; INK 3;"☐"; INK 2;"☐"; INK 1;"☐"; INK 3;"☐"
195 PRINT AT 21,7; INK 6;"■"
196 IF n>100 THEN GO TO 198
    
```

```

197 GO SUB 900
205 LET w=w-1
210 IF w=-1 THEN LET w=31
220 PRINT AT 1,0;" "
225 BEEP .001,21
230 PRINT AT 1,w;"FGH "
240 IF INKEY$="0" THEN GO TO 30
0
250 GO TO 200
300 LET t=w
310 LET a=alt
320 LET a=a+1
325 PRINT AT a-1,t;" "
327 BEEP 0.001,-12
330 PRINT AT a,t;"I"
335 PRINT AT a-1,t;" "
340 FOR b=1 TO 12: NEXT b
345 LET p=p+1
350 IF INKEY$="9" THEN GO TO 40
0
360 IF a=20 THEN GO TO 615
390 GO TO 320
400 IF p<3 THEN PRINT AT 0,2; INK 2;"You pulled your chute to soon."
401 LET u=t
403 PRINT AT a,t;" "
405 IF a>13 THEN PRINT AT 0,2;"You pulled your chute to late!"
407 IF p<3 OR a>13 THEN GO TO 626
410 LET a=a+1
420 LET t=t+(d*s)
421 IF INKEY$="9" THEN LET t=t-1
422 IF INKEY$="0" THEN LET t=t+1
425 IF t>31 THEN LET t=0
426 IF t<0 THEN LET t=31
440 IF a=20 THEN GO TO 600
450 PRINT AT a-2,u;" "
455 FOR m=7 TO 8: BEEP 0.005,m
460 PRINT AT a-1,t;"J"
470 PRINT AT a,t;"X"
    
```

# SPECTRUM PROGRAM

```

471 LET y=a-1: LET u=t
472 LET j=a: LET d=t
473 NEXT m
480 FOR v=1 TO 6: NEXT v
485 PRINT AT y,u;" "
486 PRINT AT j,d;" "
500 GO TO 410
610 IF t>13 AND t<19 THEN GO TO
700
619 PRINT AT a+1,t+1: INK 7;"L"
620 PRINT AT a-1,t: INK 7;"MNO"
625 PRINT AT a,t: INK 7;"PQR"
626 FOR d=-30 TO -19: BEEP 0.05
d
627 NEXT d
628 LET l=l-1
630 PRINT AT 10,12:"SCORE=";q
635 PRINT AT 12,12:"LIVES=";l
640 FOR v=1 TO 300: NEXT v
645 CLS
660 IF l=0 THEN GO TO 800
680 GO TO 110
700 PRINT AT a,t;"K"
705 IF t=14 OR t=16 THEN LET q=
q+1
710 IF t=15 OR t=17 THEN LET q=
q+3
720 IF t=16 THEN LET q=q+5
730 PRINT AT 10,12:"SCORE=";q
733 PRINT AT 12,12:"LIVES=";l
735 FOR v=25 TO 45: BEEP 0.02,v
: NEXT v
740 FOR v=1 TO 300: NEXT v
750 CLS
760 GO TO 110
800 PRINT AT 10,10: INK 4;"SCOR
E=";q
    
```

```

810 PAUSE 50
820 PRINT AT 15,0;"Press any ke
y to play again."
830 IF INKEY$="" THEN GO TO 820
840 CLS
850 GO TO 100
900 FOR n=1 TO 110
910 LET w=w-1
920 IF w=-1 THEN LET w=31
950 PRINT AT 1,w: INK 5;"
0;"FGH-543-210"; INK 5;"
960 NEXT n
965 PRINT AT 2,0: INK 5;"
970 RETURN
990 PRINT "YOU ARE A PARATROOPE
R WHO HAS TO BE DROPPED INTO ENE
MY TERRITORY.YOU MAY ONLY LAND O
N THE LANDING PAD AS ALL THE RES
T IS A MINE-FIELD.THE WIND SOCK
SHOWS WHICH WAY THE WIND IS BLO
WING AND ITS STENGTH SO THAT YOU
MAY CORRECT YOUR DRIFT"
991 PRINT "TO JUMP IS 0.
TO OPEN THE PARACHTTE
IS 9. ONCE THE CHUTE IS OP
EN TO MOVE RIGHT IS 0 AND TO MO
VE LEFT IS 9.YOU CAN JUMP AFTER
THE PLANE WITH THE BANNER HAS PA
SSED PREEES ANY KEY TO CON
TINUE"
992 PAUSE 0
993 CLS
999 GO TO 12
    
```

# AGF

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### PROGRAMMABLE JOYSTICK INTERFACE for Spectrum or ZX81

#### PROGRAMMABLE INTERFACE

The AGF Programmable Joystick Interface is a unique design offering the use of any Atari-compatible joystick with absolutely all software, whether it is cassette or ROM cartridge, with the Spectrum or ZX81. The hardware programmable interface requires no additional software and accurately replicates the keys of the computer in a manner which is responsive to absolutely ALL key reading methods, both BASIC and Machine Code.

The interface does not interfere with key operation and can therefore be used simultaneously with the keyboard.

There is no need to remove the interface once fitted as the rear extension connector will accommodate further expansion, i.e. printers or RAM packs etc. This important feature avoids excessive wear to the expansion port.

The key replication principle pioneered by AGF means that your own programs can use eight directional joystick movement by utilising simple key reading BASIC.

Two joystick sockets are provided which share the same keys, for use with the majority of two-player games. Several interfaces may be used on the same computer for multiple joystick applications.

The interface is programmed by a two digit code, which is looked up on a programming chart supplied, for each direction and firing button. The two numbers are then selected on a pair of leads which are clipped onto appropriately numbered strips on the interface.

Once configured this can be marked on a Quick Reference Programming Card for storing with the game. As the programming is not power dependent the interface retains the full configuration made and can be immediately used when next switched on.



#### KEY FEATURES

- Programmable design gives TOTAL software support.
- Accepts Atari, Competition Pro, Wico, Starfighter, Quick Shot, Le Stick etc.
- Rear extension connector for all other add-ons.
- Free demo program and instructions.

#### PACKAGE CONTENTS SUPPLIED

- Programmable Interface Module as illustrated, complete with clip-on programming leads.
- Self-explanatory programming chart detailing how to define which key is simulated by UP, DOWN, LEFT, RIGHT, and FIRE. This can be fixed on to the case of your computer or if preferred the protective backing can be left on. The chart is made of a very durable reverse printed plastic and is extremely easy to read.
- One pack of ten Quick Reference Programming Cards for at-a-glance setting to your games requirements. The card allows you to mark the configuration in an easy to read fashion with space to record the software title and company name.
- Video Graffiti demonstration program which is written totally in BASIC to illustrate how all eight directions and fire can be read. This is also a useful high resolution drawing program.
- 12 months guarantee and full written instructions.

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ONE	VIDEO GRAFFITI	FREE	
ZX81 <input type="checkbox"/> ZX SPECTRUM <input type="checkbox"/>		Please tick	FINAL TOTAL
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### JOYSTICK INTERFACE II for Spectrum or ZX81

NEW PRICE

or ZX81

ONLY 15.95

#### JOYSTICK INTERFACE

The Interface Module II has been specially designed to plug on to the rear connector of your ZX Spectrum or ZX81 and allow you to connect any standard Atari type digital Joysticks. All of the computer's connections are duplicated on an extension connector so that you can still use any other devices intended for use with your computer. The Interface Module II resides in the same memory space as the keyboard, which remains fully functional at all times, therefore it will not interfere with anything else connected.

When a suitable joystick is plugged into "Player 1" socket its action will mimic pressing the cursor keys, up "↑", left "←" and so on. The firing button will simulate key 0. This unique feature guarantees the best software support.

Take a look at the selection of compatible games we have listed. More are being added all the time as a result of our contact with the various software companies.

A second joystick may be connected in the "Player 2" position which simulates in a parallel fashion keys T-Y-U-V. This will allow you to play a whole new generation of two player games.

COMPATIBILITY CASSETTES £4.95

These cassettes have short programs to load before the chosen game which will convert it to use the cursor keys and therefore become compatible with the Interface Module II.

#### Cassette One converts:

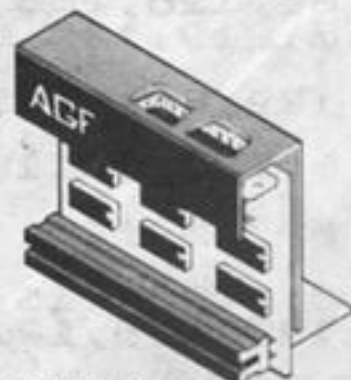
ARCADIA  
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HORACE GOES SKIING  
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#### Cassette Two converts:

CENTIPEDE  
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JET-PAC  
PSSST  
3D COMBAT ZONE  
INVADERS

NEW!

\* Will require 48K Memory



#### KEY FEATURES

- Proven cursor key simulation for maximum software support
- Accepts Atari, Competition Pro, Wico, Starfighter, Le Stick, etc Joysticks
- Second joystick facility
- Eight directions programmed in simple BASIC

#### JOYSTICKS

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	SOFTWARE		
ZX81 <input type="checkbox"/> ZX SPECTRUM <input type="checkbox"/>		Please tick	FINAL TOTAL
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# Games for the adventurous

We take a look at the latest offerings for adventure game lovers

## Mysterious Island 48K Spectrum £5.95

JN Software, 11 Latton Close, Chilton, Didcot OX11 0SU

Mysterious Island is a fairly typical adventure game. You are on board a ship which

is about to be dashed on to some rocks.

At this point you are offered a choice between a block of gold and a lifebelt.

However, I had an inkling that gold didn't float so, having donned the lifeboat and jumped, I swam to the island in search of graphics.

Alas, I found none, even when sinking into a quicksand with the bough of a tree trantalisingly out

of reach.

The inevitable 'look' and 'help' facilities are provided and at times were quite useful.

However, I found the program a little inflexible in its acceptance of human input. Only one specific word would do in each situation.

On the plus side, this adventure is well thought out and dif-

ficult to solve. I haven't solved it — yet!

	<b>M.B.</b>
instructions	90%
playability	80%
graphics	20%
value for money	65%



## Byte 48K Spectrum £5

Cases Computer Simulations, 14 Langton Way, London SE3 7TL

The object of this novel adventure game is to build a complete computer system containing 10 different items and return alive. There are seven skill levels, an unusual but welcome option.

To start with you must buy one of 10 micros, each with different characteristics. These traits bear no relation to the actual computer, and you can improve the specification by buying extra items.

To hinder you on your quest there are evil circuits which reduce the traits, and monsters. If one of the traits is reduced to the minimum, then the program gleefully announces your death.

If a monster challenges you,

you must either bribe it, take a rapid multiplication test, try to remember a word displayed momentarily on the screen, or fight physically — the choice is yours.

To fight physically you must judge when a moving arrow is at the same level as a stationary monster. The computer also has a turn, so it's a fight to a death, unless you chicken out. These are the only graphics within the game.

After each command all the information on the computer, your finances and the location are repeated, even if unchanged, which becomes very boring.

	<b>S.E.</b>
instructions	70%
playability	20%
graphics	15%
value for money	15%



## Walls and Bridges/ Zombie Mambo TI-99/4A plus joystick £19.75

TImagination, from Stainless Software, 10 Alstone Road, Stockport, Cheshire SK4 5AH

In Walls and Bridges, you play against the computer or another player. The object is to win land with your knight by strategically moving round the screen.

Once territory has been captured, however, it cannot be re-occupied — whether your own or opponent's.

Other dangers include monsters, only visible when moving, forbidden forest and larva pit.

Battle is waged through 10

rounds, points awarded to the winner of each. A range of options is provided to increase difficulty of play.

Zombie Mambo is a two-part game, each being loaded separately. The first is set in a cemetery where you must unearth three keys to open the sorcerer's tomb.

Each grave either contains a key or a zombie. If the latter, your progress is impeded by pursuit.

The second part is in the tomb itself. Here you open vaults to collect money, sometimes finding monsters or perhaps a weapon for defence.

	<b>J.W.</b>
instructions	100%
playability	90%
graphics	100%
value for money	90%



## Death Cruise Dragon £6.95

Virgin Games, 61/63 Portobello Road, London W11

Set aboard a passenger liner, this novel adventure game involves you tracking round the ship in an attempt to find the evil Mr Sinister who has planted a bomb on board.

The game is played in the Cluedo mould, with you needing to find the room that the detonator is in, the identity of the bomb and the identity of Mr Sinister.

There are two versions of the game, a single and a multi-player one. The tape loaded perfectly and the game is started by a single RUN.

The instructions with the program detail all the commands which allow you to move around

the ship, take objects and people with you and do all the other things necessary to track down the baddie.

The decks of the ship are on occasion displayed in hi-res, simply but effectively, and there in good use of sound and graphics in the game.

With 25 rooms, 25 objects and 50 people, the possible combinations are endless, and the detective also has to watch out for assassins, the time limit and the number of commands allowed.

My family particularly enjoyed the multi-player version. All in all, an entertaining game. **C.G.**

instructions	90%
playability	70%
graphics	69%
value for money	70%



## The Ring Of Darkness Dragon £10

Wintersoft, 30 Uplands Park Road, Enfield, Middlesex EN2 7PT

Wintersoft's Ring Of Darkness has aroused much favourable comment in the computing press, and I can see why.

A graphic adventure consisting of 3,000 travel days, 20-plus creatures displayed in hi-res and many other features, it is the standard that all future adventures have to aim at.

The cassette comes in a standard case with detailed, if rather drab, instructions. The loading is rather complex. You have to turn the tape over and load a total of four program files.

Once you have defined your character in terms of strength, intelligence and agility, you can

start the quest — and what a quest it is.

You must roam around the countryside searching for the secret of the dark ring. Your progress is displayed graphically with you depicted as a Z, drawn a little too small for eye comfort.

In the early stages, you are waylaid every few moves by some malevolent creature. This does get monotonous, but as you progress further into the game, the more interesting and enjoyable it gets.

There is so much to explore and puzzle over that this is truly an adventure which will keep you busy for months. **C.G.**

instructions	60%
playability	80%
graphics	85%
value for money	85%





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# Working it out without the fuss

You'll find Nick Godwin's short ZX81 program useful for those tricky calculations around the office and at home

This little program, although short, is very powerful and extremely useful in the office or at home to work out those calculations for which it's not worth writing a special program.

Its main advantage lies in the fact that variable names do not have to be defined in advance. They can be written as they come to mind.

For example, a typical area calculation program might go something like:

```
10 PRINT "ENTER LENGTH"
20 INPUT LENGTH
30 PRINT "ENTER BREADTH"
40 INPUT BREADTH
50 PRINT "BREADTH = "; BREADTH
60 PRINT "LENGTH = "; LENGTH
70 PRINT "AREA = "; LENGTH*BREADTH
```

And that's just for two

variables. When you start getting into calculating compound interest, overtime or working out the heat distribution of a central heating system, the number of variables increases and the program gets longer and longer.

With this program, you simply RUN it and enter the formula using any variable name — except X, J or K — that you happen to need.

Here are some examples:

```
"LENGTH*BREADTH*HEIGHT"
"PRINCIPAL*(INTEREST/100+1)**YEARS"
"(A=B)**(C*D)+2*(SQR N)"
```

The program then displays these variable names one by one and you enter the required value for each. If you have already assigned a value you can simply re-type the variable name.

The program then calculates the result and calls it X.

```
LET X=P*(I/100+1)**T
P=100
I=10
T=1
X=110

LET X=P*(I/100+1)**T
P=100
I=10
T=2
X=121

LET X=P*(I/100+1)**T
P=100
I=10
T=3
X=133.1

LET X=P*(I/100+1)**T
P=100
I=10
T=10
X=259.37425

LET X=APPLES+PEARS
APPLES=100
PEARS=50
X=150

LET X=(A+B)**(C*D)+2*(SQR N)
A=10
B=96
C=4
D=0.38
N=187
X=1225.3719
```

Figure 2 — some examples

```
LET X=LENGTH*BREADTH*HEIGHT
LENGTH=44
BREADTH=12
HEIGHT=10
X=5280
```

```
LET X=LENGTH*BREADTH*HEIGHT
LENGTH=99
BREADTH=17
HEIGHT=8
X=13464
```

```
1 GOTO VAL "100"
2 INPUT HEIGHT
3 RETURN
100 GOSUB 200
110 FOR J=1 TO LEN F$
```

```
LET X=PRINCIPAL*(INTEREST/100+1)**YEARS
PRINCIPAL=99
INTEREST=6.5
YEARS=3
X=126.45162
```

```
1 GOTO VAL "100"
2 INPUT YEARS
3 RETURN
100 GOSUB 200
110 FOR J=1 TO LEN F$
```

Figure 3 — how the program changes itself as it operates

```
1 GOTO VAL "100"
2 INPUT ABCDEFGHIJ
3 RETURN
100 GOSUB 200
110 FOR J=1 TO LEN F$
120 LET X$=""
130 IF F$(J) >="A" AND F$(J) <="X" THEN GOSUB 300
140 NEXT J
150 LET X=VAL F$
160 PRINT "X=";X
199 GOTO 100
200 PRINT AT 21,0;"ENTER FORMUL"
A:
210 INPUT X$
220 IF X$>"" THEN LET F$=X$
230 CLS
240 PRINT "LET X=";F$
299 RETURN
300 LET X=X+F$(J)
310 LET J=J+1
320 IF J>LEN F$ THEN GOTO 340
330 IF F$(J) >="0" AND F$(J) <=":" THEN GOTO 300
340 DIM Q$(PEEK 16523+256*PEEK 16524-2)
350 LET Q$=X$
360 FOR K=1 TO LEN Q$
370 POKE 16525+K,CODE Q$(K)
380 NEXT K
390 PRINT X$;"=";
400 GOSUB 2
410 PRINT VAL X$
499 RETURN
```

Figure 1 — listing for formula calculation

# You're low on fuel and gravity is pulling you towards disaster . . .

You are piloting a spacecraft above an airless asteroid, with only 50 units of fuel left. Can you land . . . or will you crash to the surface?

All will be revealed, once you have typed in the program!

Your spacecraft is a sprite, moved by keys Z,X (left,right) and F5,F7 (up, down). Each time you press a key, a unit of fuel is lost and you increase your velocity in that direction. Gravity is also pulling you downwards.

The asteroid is represented by a series of randomly drawn mountains and plains located at the bottom of the screen. Drawing takes time, but the display is different each time, making the game more challenging.

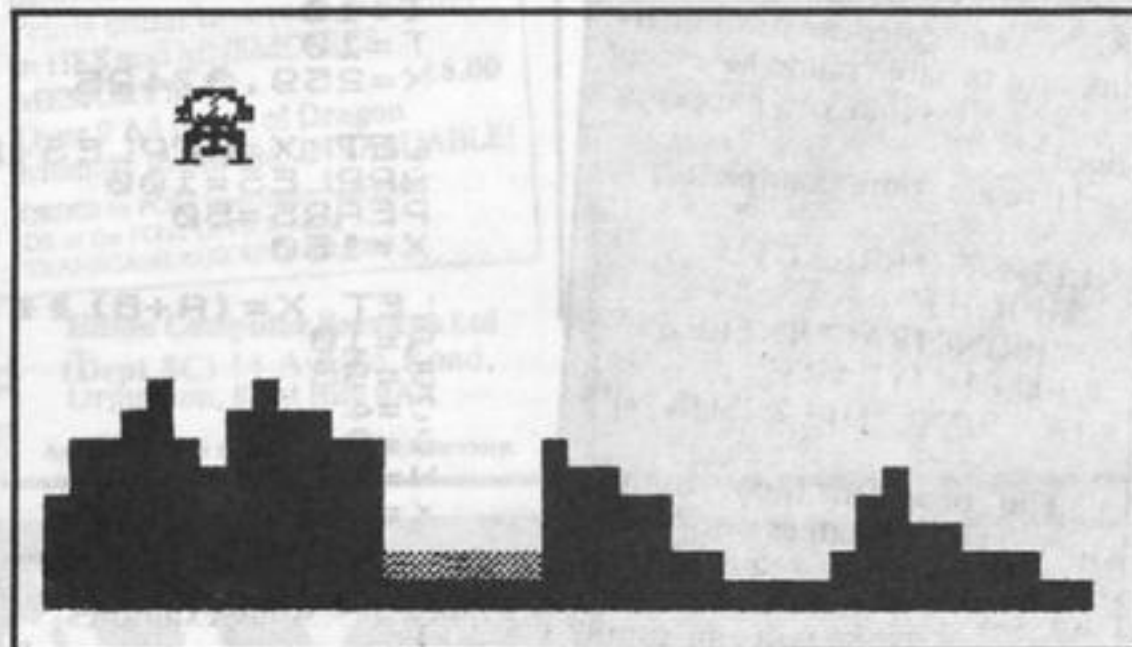
### Hints on conversion

The main conversion will be a graphic one. For those computers without sprites a graphic block can be used, and lines 100-150 can be removed. Lines 700-710 POKE the sprite's position and could be replaced by POKEing or PRINTing your own character. Line 730 PEEKs the sprite collision register, and can easily be replaced by a PEEK of the screen.

In setting up the landscape, the number of screen columns is determined by the last figure in line 220, and the first two numbers in line 260 represent the memory location of the colour and screen bytes of the lowest screen lines' start.

All other conversions are fairly simple, as the BASIC used is fairly standard, and all control characters have REM statements above explaining them.

. . . can your skill at the controls save you? Type in David Rees' program for the Commodore 64 quickly, before it's too late



How the game looks on screen. The surface of the asteroid changes for each attempt

### How it works

- 10-40 POKE user defined data to memory
- 100-150 set sprite registers
- 200-290 draw asteroid mountains
- 300-400 sets up landing pad
- 500-590 initialise variables
- 600-720 GET keys and move sprite
- 730-780 has it crashed?
- 800-1030 final messages
- 1100-1110 is sprite off screen?
- 2000-2050 another go?
- 5000-5050 sprite graphic DATA

Line 510 defines the amount of fuel and gravity. Once you have mastered the game you can change the level by increasing gravity or decreasing fuel. Gravity change gives the best series of levels. But, be warned — if it is set above 0.7, it is impossible for the ship to stay above the ground.

An interesting feature is line 290. If location 650 is set to zero, the keyboard behaves normally, but if 128 is POKEd, all keys will repeat, a very useful feature in many games.

Finally, all control characters in PRINT lines have REM statements in preceding lines for clarity. These should be removed so you can enjoy the full speed of the game.

### Main variables

- F fuel
- G gravitational force
- SX,SY sprite position of landing pad
- X,Y sprite position
- V start of sprite registers
- VX,VY velocity in specified direction

```

110 POKEV+21,1:POKEV+16,0
120 POKEV+28,1:POKEV+37,6
130 POKEV+38,7:POKE2040,255
140 POKEV+39,2
150 POKEV+1,50:POKEV,24
198 REM*SET UP LANDSCAPE*
199 REM*[CLS]
200 PRINT" ";
210 Y=RND(1)*7+7
220 FORX=0TO39
230 Y=Y+RND(1)*5-2.5
240 IFY<0THENY=0
250 IFY>17THENY=17
260 C=56256+X:S=1984+X:Z=160
270 FORP=0TOY:POKES-P*40,Z:POKEC-P*40,4:NEXT
280 NEXTX
290 POKE650,128
299 REM* SET UP PAD *
300 L=INT(RND(1)*3)
310 X=INT(RND(1)*20)+5
    
```

```

339 REM*[HOME]
340 PRINT" "SPC(L*40)
349 REM*[DOWN*5]
350 PRINT"XXXXXXXX"
360 FOR N=0 TO 13
370 PRINTTAB(X) " "
380 NEXT
389 REM*..[RVS ON][CYAN]
390 PRINTTAB(X) "XXXXXXXX"
400 SX=X*8+24:SY=(L+18)*8+50
500 X=24:Y=58
510 F=50:G=.2
520 VX=0:VY=0
590 P=PEEK(V+31)
599 REM*MAIN ROUTINE*
600 GETA$
605 IFF=0THEN1100
610 IFA$="Z"THENF=F-1:VX=VX-1
620 IFA$="X"THENF=F-1:VX=VX+1
629 REM*[F5]
    
```



## COMMODORE 64 PROGRAM



```

630 IFA$="I" THEN F=F-1:VY=VY-1
639 REM*[F7]
640 IFA$="II" THEN F=F-1:VY=VY+1
650 X=X+VX:IFX<0 THEN X=0
660 IFX>511 THEN X=511
670 Y=Y+VY:IFY<58 THEN Y=58
680 IFY>255 THEN Y=255
690 VY=VY+G
700 POKEV,X AND 255:POKEV+1,Y
710 POKEV+16,X/256
719 REM*[CLS]..[LEFT]
720 PRINT" F " " "
730 P=PEEK(V+31):IFP=0 THEN 600
740 IFX<SX OR X>(SX+30) THEN 1000
750 A=SY AND 248:B=Y AND 248
760 IFA<>B THEN 1000
770 SP=(VY/12+VX/12)/10.5
780 IF SP>4 THEN 900
800 FORN=0 TO 999:NEXT:POKEV+21,0
809 REM*[CLS]
810 PRINT"YOU LANDED ON THE PAD WITH A ";
820 PRINT"VELOCITY"
830 PRINT"OF "SP" M/S"
840 PRINT"WELL DONE!"
850 GOTO 2000
900 FORN=0 TO 999:NEXT:POKEV+21,0
909 REM*[CLS]
910 PRINT"YOU CRASHED ON THE PAD WITH A ";
920 PRINT"VELOCITY"
930 PRINT"OF "SP" M/S"
940 PRINT"BAD LUCK!"
950 GOTO 2000
1000 FORN=0 TO 999:NEXT:POKEV+21,0
1009 REM*[CLS]
1010 PRINT"BAD LUCK."
1020 PRINT"YOU CRASHED OUTSIDE THE BASE."
1030 GOTO 2000
1100 IFX>5 AND X<510 THEN 650
1110 GOTO 1000
2000 FORN=0 TO 9:GETA$:NEXT
2009 REM*[DWN]
2010 PRINT"WOULD YOU LIKE ANOTHER GO?"
2020 GETA$:IFA$="" THEN 2020
2030 IFA$="Y" THEN 100
2040 IFA$="N" THEN END
2050 GOTO 2010
4999 REM*SPRITE DATA*
5000 DATA 5,84,,5,148,,23,181,,31,189,
5010 DATA 95,189,64,111,190,64,106,170,64
5020 DATA 94,173,64,26,169,,23,181,
5030 DATA 5,148,,21,85,,20,133,,16,129,
5040 DATA 18,161,,18,161,,16,1,,84,5,64
5050 DATA,,,,,,,,,
    
```

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# Put some order into these numbers

Square Puzzle is a version of a game which involves sorting the numbers one to 15 in ascending order from a random arrangement in a grid as shown in the drawings.

Full instructions are included in the program, but here's a brief summary.

To move all of the numbers in a particular row or column up, left, right or down, press the key U,L,R or D respectively.

To move just one number into the space, type U1,L1,R1 or D1, and to move two numbers type U2,L2,R2 or D2.

Follow these commands by RETURN.

Typing \* when required will end the game and tell the player the minimum number of moves in which the game could have been completed.

The player is then given the option of starting another game or ending the program. On completion of the game correctly your

**Remember that game you played as a child which involved moving around numbered squares of plastic into numerical order? Here's the micro version, written for the unexpanded VIC-20 by Adrian Brain**

game is rated against the number of moves required to finish the game and you are given the option of playing another game.

### How it works

5-10 sets screen and border colours black, switches to lower case and reserves variable space in memory  
 20-130 instructions  
 250-450 initialises variables and generates random arrangement of numbers  
 700-770 asks user for input and checks the validity of the input  
 520-695 prints present position of numbers and the number of moves made so far  
 780-1030 main move routine, checks to see if the correct order has been achieved  
 1045 goes to subroutine at 4000 to produce screen and sound display on winning  
 1050-1150 rates your performance with the least number of moves required to complete puzzle, and asks if another game is required

### Hints on conversion

Square Puzzle should be easy to convert to most popular micros as only a few machine specific commands are used in the program. However, on micros with a screen size of greater than 22 by 23 characters, the printout of the number square will be a little small and so the grid could be made larger by a few extra spaces.

The inverse characters in the PRINT statements mostly relate to changing the colour of the printed text.

These control characters are the same for the CBM 64, and thus need no conversion.

For the Spectrum, an INK command will suffice, or a VDU command on BBC machines.

Other control commands:

**Inverse Q** simply moves the cursor down one line. For computers that use ASCII codes, simply replace with PRINT CHR\$(10).

**Inverse right bracket** moves the cursor position one place to the right. Replace in ASCH by PRINT CHR\$(19).

**Inverse circle** moves cursor up one line. Replace in ASCII with PRINT CHR\$(11).

**Inverse R** sets reverse field for following print characters, and may be replaced according to the machine or simply ignored.

**Inverse heart** clears the screen. Replace with CLS on Spectrum or VDU 12 on the BBC.

The poke locations are for mainly screen colours and sound effects. For the CBM 64, the values may be simply replaced, for the Spectrum PAPER and

INK commands may be used and for the BBC a VDU command could be used.

Location and function of POKES:

**36879** screen and border colours; 8 sets both black, 27 sets border cyan and screen white.

**36878** sets speaker volume. 15 is loudest, 0 turns it off.

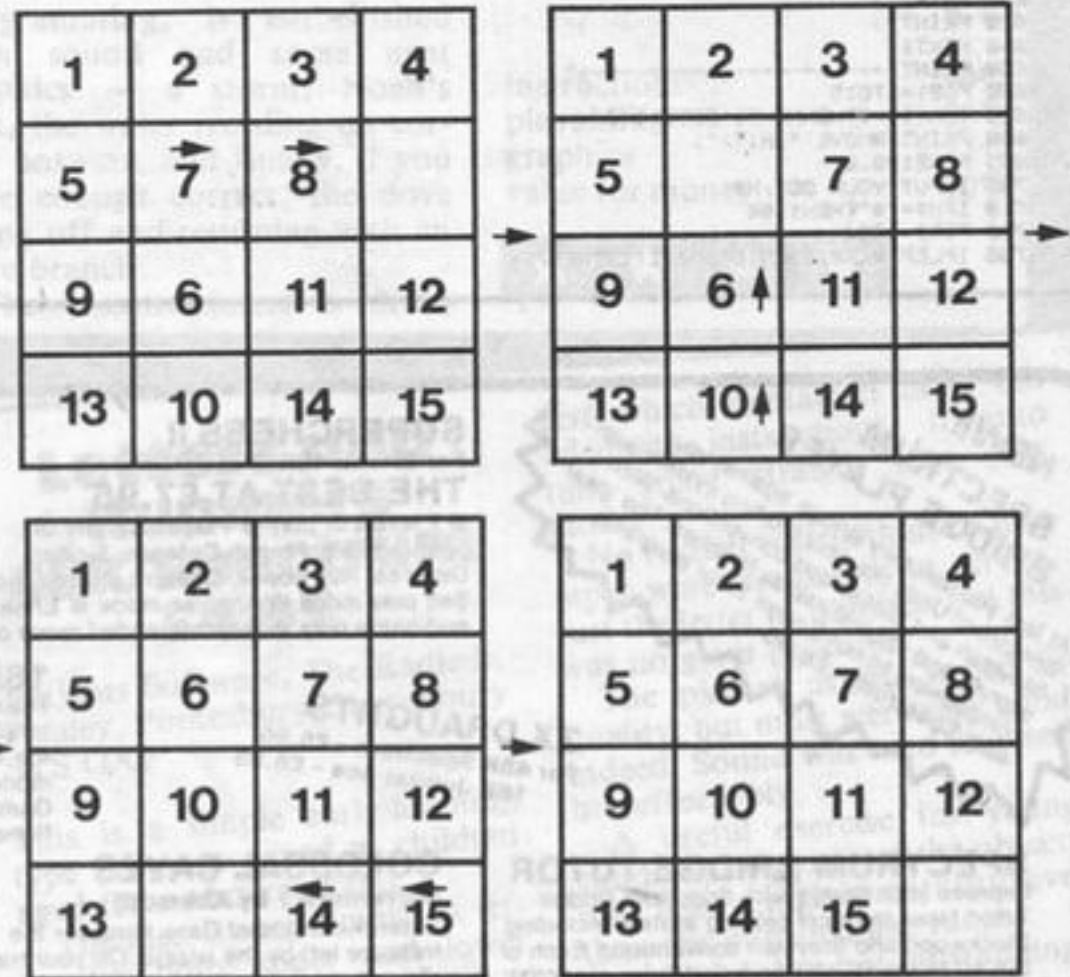
**36874-36877** sets tones on the four sound generators. These POKES should be replaced by appropriate BEEP or SOUND functions. They are used only in lines 1165-1190 and 4000-4040 to produce footstep sounds and an ascending and descending sequence of notes. These effects occur only at the end of the game and may be left out if a silent game is required.

**36869** sets the text into upper and lower case modes; 242 for lower case and 240 for upper case and again, may be ignored.

**198** Clears the keyboard buffer if poked to 0. The location is the same on the CBM 64 but will have to be changed for other micros.

The GET command may need some explaining. It gets just one character from the keyboard and is directly replaceable on Sinclair machines by the INKEYS function.

The only other peculiar features are the strange graphics symbols in the instructions. These are simply shifted letters to produce capital letters in lower case mode and it is fairly obvious what they are when typing in.



Closing moves in a typical game of Square Puzzle



# VIC-20 PROGRAM

```

5 POKE36879,8:POKE36869,242
10 DIMA(16),D(4)
20 PRINT"*****QUARE**PUZZLE****"
30 PRINT"THIS GAME IS A VERSION OF A FAMOUS PUZZLE."
40 PRINT"THE OBJECT OF THE GAME IS TO ARRANGE THE NUMBERS IN ASCENDING"
50 PRINT"ORDER FROM TOP LEFT TO BOTTOM RIGHT."
60 PRINT"IT A KEY TO CONTINUE."
70 GETO:IF O=" " THEN GOTO 80
80 PRINT"THE COMMANDS ARE AS FOLLOWS:"
90 PRINT"-----"
91 PRINT"-----"
92 PRINT"-----LEFT"
93 PRINT"-----RIGHT"
95 PRINT"-----END GAME"
100 PRINT"-----FOLLOW THIS LETTER WITH A NUMBER"
110 PRINT"-----INDICATING THE NUMBER OF PIECES TO BE MOVED"
120 PRINT"-----MAX."
130 PRINT"-----PIECES P = 3"
250 A$="LRUD"
260 M=0
280 D(1)=-1:D(2)=1:D(3)=-4:D(4)=4
310 FOR I=1 TO 15
320 A(I)=I
330 NEXT I
340 A(16)=0
350 P=16
360 R=INT(RND(1)*10)+12
370 FOR W=1 TO R
380 S=0
390 N=INT(RND(1)*3)+1
400 IF ABS(D)=1 THEN D=D*(INT(RND(1)*2)+1):GOTO 420
410 D=D*(INT(RND(1)*2)+3)
420 GOSUB 820
430 IF N<=R AND S=1 THEN N=0:S=0:GOTO 420
440 IF N<=R AND S=1 THEN N=0:D=-D:GOTO 420
450 NEXT W
470 INPUT"RETURN TO CONTINUE";O$
480 W=0:PRINT
490 POKE36869,240
520 PRINT"-----"
530 PRINT"|"
540 M=M+1
550 FOR I=0 TO 12 STEP 4
560 PRINT"|"
570 FOR J=1 TO 4
580 IF A(I+J)=0 THEN PRINT" "
590 IF A(I+J)<10 THEN PRINT" "
600 PRINT" ";A(I+J);
610 NEXT J
620 PRINT"|"
630 PRINT"|"
640 NEXT I
650 PRINT"-----"
660 FOR I=1 TO 15
670 IF A(I)=1 THEN NEXT I:GOTO 1040
680 PRINT"MOVE:";M;"|";
690 POKE198,0
700 INPUT"YOUR 00";X$
710 IF X$=" " THEN I=10
720 FOR I=1 TO 4
730 IF LEFT$(X$,1)=MID$(A$,I,1) THEN I=780

```

```

740 NEXT I
750 PRINT"FORMAT WRONG"
770 GOTO 700
780 D=D(I)
790 GOSUB 810
800 GOTO 520
810 N=VAL(CRIGHT$(X$,1))
820 LET Z=P-(D#N):O=P-D
822 IF Z<=R AND Z<17 AND Z<=R AND Z<17 THEN GOTO 700
830 IF Z<=R AND Z<17 THEN RETURN
840 PRINT"INVALID MOVE":GOTO 700
870 C=1
880 IF ABS(D)=1 THEN GOTO 890
890 IF N<=R AND Z<17 THEN GOTO 700
900 IF P-(C#D)>=R AND P-(C#D)<17 THEN C=C+1:GOTO 900
910 N=C-1
920 FOR I=1 TO N
930 A(P)=A(P-D)
940 A(P-D)=0
950 P=P-D
960 NEXT I
970 RETURN
980 E=INT((P-1)/4)*4+1
990 IF P-(N#D)<=R AND P-(N#D)>=R AND P-(N#D)<17 THEN GOTO 830
1000 IF N<=R AND Z<17 THEN GOTO 700
1010 IF P-(C#D)>=R AND P-(C#D)<17 THEN C=C+1:GOTO 1010
1020 N=C-1
1030 GOTO 920
1040 M=M-1
1045 GOSUB 840
1050 IF M<=R THEN PRINT"AMAZING PERFORMANCE!!":GOTO 1090
1060 IF M<=R THEN PRINT"HELL DONE!!":GOTO 1090
1070 IF M<=R THEN PRINT"PRETTY AVERAGE!!":GOTO 1090
1075 PRINT"YOU ARE SO BAD!!"
1080 PRINT"IT IS YOUR TURN TO GO TO COMPLETE THE PUZZLE!"
1100 PRINT"THE PUZZLE COULD HAVE BEEN SOLVED IN";R;"MOVES"
1120 PRINT"DO YOU WANT TO PLAY ANOTHER GAME?"
1130 GET C$:IF C$=" " THEN I=130
1140 IF C$="Y" THEN POKE36869,242:RUN
1150 PRINT"SEE YOU AGAIN THEN!!"
2000 END
4000 FOR K=128 TO 255:POKE36879,K:POKE36878,15:POKE36874,K:POKE36876,K
4010 FOR J=1 TO 5:NEXT J:NEXT K
4020 POKE36878,0
4030 POKE36879,8:POKE36874,0:POKE36876,0
4040 RETURN

```

## NEW!! SPECTRUM BRIDGE PLAYER

At last you can play Bridge against your Spectrum! Uses the Acol bidding system with Stayman and Blackwood conventions. With scoring and inquest/replay facilities. The ideal complement to our Bridge Tutor programs. 48K Spectrum - £8.95

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## ORIGINAL SPECTRUM FORTH

Similar facilities to the floating point version but has only integer arithmetic. 16K and 48K Spectrum - £9.95

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For Sinclair 48K SPECTRUM  
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Enter the Colossal Cave, discover the treasure left by the wizard. On your travels you will meet dragons, snakes, trolls and other denizens of the underworld. Be warned, this adventure can be addictive. Includes a save facility so that the adventure can be continued from the point reached when saved. 48K Spectrum £6.95

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The ultimate Machine Code Tool Kit for the Spectrum with 60 plus routines. Both 16K and 48K versions on each cassette. 16K and 48K Spectrum - £7.95

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## Word Olympics 32K Atari 400/800 £14.94

English Software, 50 Newton Street, Piccadilly, Manchester M1 2EA

This is the third in the new educational series of programs produced for the Atari by English Software. Like programs one and two, it is designed to test the user in a basic skill — in this case, correctly spelling different words by sorting out a series of anagrams.

The skill level is selected by choosing a time limit to solve each problem — graded from 'Crawler team 6' to 'Olympian team 1', which is the highest honour available — and by choosing the size of the word to be solved.

The degree of difficulty of each anagram is set by the

number of letters in each word, and is graded from 'up to four letters' to 'up to eight letters' which is rather hard, especially when trying to sort out words such as 'operator' and 'theatre'.

The instructions accompanying the program are short but adequate, and once the program is up and running it is very easy to use.

The program appears to be bug-free, although in two-player mode the control is not as precise and smooth as I would like — perhaps it would benefit from being compiled.

Altogether this is a very good addition to English Software's educational series. **D.R.**

instructions	85%
playability	80%
graphics	90%
value for money	85%



## Animal Anagrams 48K Spectrum £5

Image, 185 Elm Road, New Malden, Surrey KT3 3HX

Is it a game? An educational program? It's a bit of both.

Noah's Ark is drawn, and the jumbled letters of an animal appear in one of the windows. It's inaccurate to call it an anagram because an anagram is a proper word made from the letters of another word.

You have two guesses at the word. Only the first guess, if correct, scores. If you are wrong the first time then a clue is given — a

second wrong guess, you get the answer and the next word is displayed.

This simple exercise, much beloved of books on elementary programming, is embellished with sound and some neat graphics — a storm, Noah's Ark, the water receding on correct answers, and finally, if you have enough correct, the dove flying off and returning with an olive branch.

The cassette insert is drab,

simple but precise instructions are provided on screen, and the program loaded first time.

	<b>R.E.</b>
instructions	90%
playability	83%
graphics	72%
value for money	70%



## Spelling Bee ZX81 16K £5

Image Systems, 185 Elm Road, New Malden KT3 3HX

The ZX81 presents a picture, and the child is asked to spell either the name of the object, or the part of it indicated by a flashing question mark.

The graphics are good and very clear (animals, butterflies, everyday objects such as telephones or cookers, for example.)

The child has two tries at each word, and is rewarded with a large 'yes' or 'no' after each attempt. After the second 'no' the correct word is displayed.

There are 40 different pictures, and 100 spellings which, according to the makers, get progressively more difficult. A hundred is not a great many, but

then with a ZX81, space is necessarily limited.

Nor are all the words exactly vital for a child to learn, but then without speech you have to choose words which can be graphically illustrated.

A score is kept and given at the end of ten words, together with an animated display and comment. If the child just wants to enjoy the pictures this can be done by entering J.

Two programs are offered, easy and hard, one on each side of the cassette. All instructions are presented on screen. Although somewhat limited, Spelling Bee is well produced and visually pleasing. **C.C.-R.**

instructions	70%
playability	75%
graphics	85%
value for money	65%



## Letters and Numbers 48K Spectrum £4.95

Jimjams Software, The Radleth, Plealey, Pontesbury, Shrewsbury SYS OXF

This is a simple early-learning type program aimed at children aged from two years old.

The idea is very simple. A letter (in both upper and lower case) or a number is displayed at the top right of the screen. Pressing the key of that character causes a picture to be drawn.

A score is kept of both correct and incorrect presses, and displayed after each drawing. Some of the drawings are animated and have simple sound effects.

The program had a simple in-

sert which contained brief but adequate instructions. It auto ran, going straight into play mode.

No further instructions or prompts were presented on screen, just the letter or number, but this was no great problem.

The picture drawn varied in quality, but most were very good indeed. Sound was used less well but effectively.

A useful exercise for young children, but some of the objects may need a higher maturity level than the intended age range.

A useful, but not outstanding, aid to alpha-numeric character recognition. **R.E.**

	<b>R.E.</b>
instructions	71%
playability	49%
graphics	52%
value for money	60%



## Identikit 48K Spectrum £5.95

Stell Software, 36 Limefield Avenue, Whalley, Lancs

This is a novelty program for the Spectrum, and is based on those books of faces which have several sections to each page.

You have a blank oval face and options to choose hair, eyes,

nose, ears or mouth. You then have the choice of five different pre-drawn features.

By choosing the various parts some rather weird but not very realistic faces can be created.

Once you have completed your Picasso, then you have a further option which neither he or those old books could provide — an option to wiggle the ears or nose, smile or frown, blink either eye or do all these movements in sequence.

This program is easy to use, responsive and fast enough to do what little moving is required.

The graphics are fair, sound is virtually non-existent.

You can save and load a completed face on tape but not make a printer copy. This would be easy to add, and Stell should really have included it.

I feel that I shouldn't like this frivolous use of a sophisticated computer, but I did. I'm sure many children between 3 and 10

could get many hours of innocent amusement from it. **R.E.**

instructions	72%
playability	51%
graphics	53%
value for money	60%



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### APEX SOFTWARE

Swiss Cottage, Hastings Road,  
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Tel: Hastings (0424) 51175

# THE

# Ω MEGA RUN

... is coming

# You're alone . . . and here come the invaders

Waves of invaders are on their way to conquer the planet. Only you, armed with a laser cannon, can fight them off.

My Texas Invaders game runs on the unexpanded TI-99/4.

To ensure the game is fast moving, the invaders do not move and sound is kept to a minimum.

But if you do happen to miss an invader you lose one of your three lives.

### How it works

- 10-20 clear screen and turn it black
- 30-360, 1180-1260, 1470,1540 define characters, assign colours
- 370-850 title screen
- 860-990 ask if instructions needed
- 1000-1170 print instructions
- 1270-1290 set up variables
- 1300-1460 set up first screen
- 1550 set up variable for number of invaders
- 1560-1620 set up screen
- 1630-1690 detect keys, branch to movement, fire routines
- 1700-1840 left, right base movement routines
- 1850-1920 fire, detect hit routine
- 1930-2060 hit routine, branch to miss routine if no hits
- 2070-2120 if miss deduct life
- 2130-2180 add 10 to score
- 2190-2350 if all lives lost ask if new game wanted

**Earth is under threat again. Armed with a laser cannon, you face hordes of enemy fighters. Type in Eric Liddell's game for the TI-99/4A before we're conquered**

```

10 CALL CLEAR
20 CALL SCREEN(2)
30 RESTORE 80
40 FOR I=48 TO 58
50 READ A$
60 CALL CHAR(I,A$)
70 NEXT I
80 DATA 007E7E66667E7E,003838181
83C3C,007E7E0E707E7E,007E063E067
E7E,0060606C7E7E0C,007E7E700E7E7
E,007E607E667E7E
90 DATA 007E7E66060606,003C243C6
67E7E,007E7E667E7E06,3C5A187EFFE
74224
100 RESTORE 150
110 FOR I=65 TO 73

```

**Variables**  
**MISS** number of times shot has failed to hit invader  
**Sc** score  
**c** column position of laser base  
**NV** number of invaders. When NV equals zero a new wave appears

**Hints on conversion**  
 TI BASIC is fairly standard apart from its graphics. Characters are defined on an eight grid using the CALL CHAR command followed by a hexadecimal string. Colours are set by using the CALL COLOR command.  
 Here are some of the commands I have used in the program:  
**CALL HCHAR** and **CALL VCHAR** position a character at specified row and column on the screen and optionally repeat it horizontally or vertically  
**CALL GCHAR** tests specified character positions on the screen to see if they are occupied  
**CALL SCREEN** sets the screen to any of 16 colours  
**CALL CLEAR** is a direct equivalent of CLS (clear screen)

```

120 READ A$
130 CALL CHAR(I,A$)
140 NEXT I
150 DATA 003C24247E6666,183C7EDB
DBC366,007E424060627E,007E426262
627E,007E40407C607E,007E40407C60
6
160 DATA 007E424066627E,00242424
7E6666,00101010181818
170 CALL CHAR(75,"004444786464")
180 CALL CHAR(76,"0040406060607E
")
190 RESTORE 240
200 FOR I=78 TO 89
210 READ A$
220 CALL CHAR(I,A$)
230 NEXT I
240 DATA 007E4262626262,007E4246
46467E,007E42427E606,007E4246464
67F01,007C44447E6262,007E42701E4
67E
250 DATA 007E1010181818,00424262
62627E,00626262222418,0062626A6A
4A76,00426618186642,004242241818

```

```

18
260 CALL COLOR(3,6,2)
270 CALL COLOR(4,6,2)
280 FOR I=5 TO 8
290 CALL COLOR(I,5,2)
300 NEXT I
310 CALL CHAR(96,"08022E9FBFFFF3
7F")
320 CALL CHAR(97,"104074F9FDFFCF
FE")
330 CALL CHAR(98,"3F150F07224224
18")
340 CALL CHAR(99,"FC50F870222112
0C")
350 CALL CHAR(100,"183C7EE73C5AC
381")
360 CALL COLOR(9,9,2)
370 CALL HCHAR(4,15,96)
380 CALL SOUND(-10,110,0)
390 CALL HCHAR(4,16,97)
400 CALL SOUND(-10,115,0)
410 CALL HCHAR(5,15,98)
420 CALL SOUND(-10,110,0)
430 CALL HCHAR(5,16,99)

```

## TI-99/4A PROGRAM

```

440 CALL SOUND(100,120,5)
450 T$="          TEXAS"
460 R=7
470 GOSUB 520
480 T$="          INVADERS"
490 R=9
500 GOSUB 520
510 GOTO 570
520 FOR I=1 TO LEN(T$)
530 CALL HCHAR(R,I,ASC(SEG$(T$,I,1)))
540 CALL SOUND(-10,3000,0)
550 NEXT I
560 RETURN
570 FOR I=1 TO 32 STEP 2
580 FOR R=15 TO 20 STEP 5
590 CALL HCHAR(R,I,100)
600 CALL SOUND(-100,115,10)
610 CALL HCHAR(R,I,66)
620 CALL SOUND(-100,110,15)
630 NEXT R
640 NEXT I
650 FOR I=1 TO 100
660 NEXT I
670 FOR I=57 TO 48 STEP -1
675 CALL SOUND(-10,4300,0)
676 CALL SOUND(-10,5000,0)
680 CALL HCHAR(12,16,I)
690 FOR D=1 TO 200
700 NEXT D
720 NEXT I
725 CALL HCHAR(12,16,100)
730 FOR I=0 TO 30 STEP 2
740 CALL SOUND(-10,110,15,110,15,220,15)
750 CALL SOUND(-100,110,I,110,I,220,I)
760 CALL SOUND(-100,110,I,220,I,330,I)
770 CALL SOUND(-100,220,I,220,I,110,I)
780 CALL SOUND(-100,110,I,110,I,220,I)
790 NEXT I
800 P$="          PRESS ANY KEY TO CONTINUE"
810 FOR I=1 TO LEN(P$)
820 CALL HCHAR(22,I,ASC(SEG$(P$,I,1)))
830 NEXT I
840 CALL KEY(0,K,S)
850 IF S=0 THEN 840
860 CALL CLEAR
870 I$="          DO YOU WANT INSTRUCTIONS"
880 Y$="          Y OR N"

```

```

890 FOR I=1 TO LEN(I$)
900 CALL HCHAR(10,I,ASC(SEG$(I$,I,1)))
910 NEXT I
920 FOR I=1 TO LEN(Y$)
930 CALL VCHAR(I,16,ASC(SEG$(Y$,I,1)))
940 NEXT I
950 CALL KEY(0,K,S)
960 IF S=0 THEN 950
970 CALL CLEAR
980 IF K=ASC("Y") THEN 1000
990 IF K=ASC("N") THEN 1180 ELSE 950
1000 CALL CLEAR
1010 I$="          INSTRUCTIONS"
1020 R=5
1030 GOSUB 1110
1040 I$="          KEYS      S LEFT  D R
IGHT"
1050 R=10
1060 GOSUB 1110
1070 I$="          USE FULL STOP TO FIRE"
1080 R=13
1090 GOSUB 1110
1100 GOTO 1180
1110 FOR I=1 TO LEN(I$)
1120 CALL HCHAR(R,I,ASC(SEG$(I$,I,1)))
1130 NEXT I
1140 FOR I=1 TO 200
1150 NEXT I
1160 CALL CLEAR
1170 RETURN
1180 RESTORE 1230
1190 FOR I=104 TO 115
1200 READ A$
1210 CALL CHAR(I,A$)
1220 NEXT I
1230 DATA FFFFFFFFFFFFFFFFFF,7F3F392C8727491,FEFC9C32E1E29408,FF82F4081F3C7FFC,FF412F10F83CFE3F,F8F0F8F8FCFDFFFF
1240 DATA 0085EFFFFFFFFFFFFF,24242424242DBFFF,0F1F0F0787CFFFFFF,0080C0E0E0F0F0F8,010303010103070F,F1824429924C324
1250 CALL COLOR(10,13,2)
1260 CALL COLOR(11,13,2)
1270 MISS=4
1280 SC=-10
1290 C=16
1300 GOSUB 2070
1310 GOSUB 2130
1320 CALL HCHAR(24,1,104,32)

```



## TI-99/4A PROGRAM

```

1330 CALL HCHAR(23,1,104)
1340 CALL HCHAR(23,32,104)
1350 CALL HCHAR(23,2,109)
1360 CALL HCHAR(23,31,112)
1370 CALL HCHAR(23,4,111,26)
1380 CALL HCHAR(22,4,115,26)
1390 CALL HCHAR(22,1,104)
1400 CALL HCHAR(22,2,113)
1410 CALL HCHAR(21,1,113)
1420 CALL HCHAR(22,31,114)
1430 CALL HCHAR(22,32,104)
1440 CALL HCHAR(21,32,114)
1450 CALL HCHAR(22,3,107)
1460 CALL HCHAR(22,30,108)
1470 CALL CHAR(144,"000018243C7E
FF3C")
1480 CALL CHAR(145,"423C66FF7E24
42")
1490 CALL COLOR(15,11,2)
1500 CALL CHAR(152,"101008081010
0808")
1510 CALL CHAR(153,"001004104804
1")
1520 CALL CHAR(154,"482448946214
2892")
1530 CALL CHAR(155,"8822954834AA
449")
1540 CALL COLOR(16,16,2)
1550 NU=44
1560 FOR I=7 TO 27 STEP 2
1570 CALL HCHAR(6,I,145)
1580 CALL HCHAR(9,I,100)
1590 CALL HCHAR(12,I,58)
1600 CALL HCHAR(15,I,66)
1610 NEXT I
1620 CALL HCHAR(21,C,144)
1630 CALL KEY(0,K,S)
1640 IF S=0 THEN 1630
1650 IF MISS=0 THEN 2190
1660 IF NU=0 THEN 1550
1670 IF K=83 THEN 1700
1680 IF K=68 THEN 1780
1690 IF K=46 THEN 1850
1700 C=C-1
1710 CALL HCHAR(21,C,144)
1720 CALL HCHAR(21,C+1,32)
1730 IF C<4 THEN 1760
1740 GOTO 1630
1750 GOTO 1630
1760 C=4
1770 GOTO 1630
1780 C=C+1
1790 CALL HCHAR(21,C,144)
1800 CALL HCHAR(21,C-1,32)
1810 IF C>29 THEN 1830
1820 GOTO 1630
1830 C=29

```

```

1840 GOTO 1630
1850 FOR I=20 TO 4 STEP -1
1860 CALL GCHAR(I,C,SS)
1870 IF SS<>32 THEN 1930
1880 CALL HCHAR(I,C,152)
1890 CALL HCHAR(I,C,32)
1900 IF I=4 THEN 2050
1910 NEXT I
1920 GOTO 1630
1930 CALL HCHAR(I,C,32)
1940 FOR G=153 TO 155
1950 CALL HCHAR(I,C,G)
1960 NEXT G
1970 FOR G=155 TO 153 STEP -1
1980 CALL SOUND(-200,-7,0)
1990 CALL HCHAR(I,C,G)
2000 NEXT G
2010 CALL HCHAR(I,C,32)
2020 NU=NU-1
2030 GOSUB 2130
2040 GOTO 1630
2050 GOSUB 2070
2060 GOTO 1630
2070 MISS=MISS-1
2080 L$=" LIVES "&STR$(MISS)
2090 FOR I=1 TO LEN(L$)
2100 CALL HCHAR(1,I,ASC(SEG$(L$,
I,1)))
2110 NEXT I
2120 RETURN
2130 SC=SC+10
2140 S$=" SCORE "&STR$(SC)
2150 FOR K=1 TO LEN(S$)
2160 CALL HCHAR(3,K,ASC(SEG$(S$,
K,1)))
2170 NEXT K
2180 RETURN
2190 CALL HCHAR(21,C,32)
2200 FOR I=0 TO 30
2210 CALL SOUND(-200,110,I,-7,I)
2220 NEXT I
2230 CALL SOUND(-10,3000,0)
2240 A$=" ANOTHER GAME Y
OR N"
2250 FOR I=1 TO LEN(A$)
2260 CALL HCHAR(12,I,ASC(SEG$(A$,
I,1)))
2270 NEXT I
2280 CALL KEY(0,K,S)
2281 CALL HCHAR(2,1,32,32)
2290 IF S=0 THEN 2280
2300 IF K=ASC("Y") THEN 2320
2310 IF K=ASC("N") THEN 2340 ELSE
2280
2320 CALL HCHAR(12,1,32,32)
2330 GOTO 1270
2340 CALL CLEAR
2350 END

```

**Top Ten programs for the Dragon**

- |    |                         |                |
|----|-------------------------|----------------|
| 1  | Ring of Darkness        | Wintersoft (6) |
| 2  | Nightflight             | Salamander (7) |
| 3  | Android Attack          | Microdeal (4)  |
| 4  | Frogger                 | Microdeal (1)  |
| 5  | Mined Out               | Quicksilva (-) |
| 6  | Cuthbert Goes Walkabout | Microdeal (-)  |
| 7  | Shuttle                 | Microdeal (3)  |
| 8  | The King                | Microdeal (2)  |
| 9  | Space War               | Microdeal (5)  |
| 10 | Champions               | Peaksoft (-)   |

Compiled by Boots. Figures in brackets are last week's positions

**Top Ten programs for the ZX81**

- |    |                   |                |
|----|-------------------|----------------|
| 1  | Flight Simulation | Sinclair (1)   |
| 2  | Space Raiders     | Sinclair (3)   |
| 3  | Espionage Island  | Sinclair (8)   |
| 4  | 1K Games          | Sinclair (-)   |
| 5  | Fantasy Games     | Sinclair (-)   |
| 6  | Defender          | Quicksilva (9) |
| 7  | Scramble          | Quicksilva (5) |
| 8  | Football Manager  | Addictive (2)  |
| 9  | Ship of Doom      | Sinclair (4)   |
| 10 | Chess             | Sinclair (7)   |

Compiled by Boots. Figures in brackets are last week's positions

**Top Ten programs for the Spectrum**

- |    |                        |                       |
|----|------------------------|-----------------------|
| 1  | Scrabble               | Psion (1)             |
| 2  | Jet Pac                | Ultimate (3)          |
| 3  | The Hobbit             | Melbourne House (2)   |
| 4  | Flight Simulation      | Psion (4)             |
| 5  | Trans-Am               | Ultimate (6)          |
| 6  | Horace and the Spiders | Psion/M. House (5)    |
| 7  | Horace Goes Skiing     | Psion/M. House (9)    |
| 8  | Super Spy              | Richard Shepherd (8)  |
| 9  | 3D Desert Patrol       | Computer Rentals (10) |
| 10 | Ah Diddums             | Imagine (7)           |

Compiled by W. H. Smith. Figures in brackets are last week's positions

**Top Ten for the VIC-20 and Commodore 64**

- |    |                                  |                 |
|----|----------------------------------|-----------------|
| 1  | Arcadia (VIC)                    | Imagine (1)     |
| 2  | Wizard and the Princess (VIC)    | Umbrella (-)    |
| 3  | Hover Bover (64)                 | Llamasoft (-)   |
| 4  | Gridrunner (VIC)                 | Llamasoft (2)   |
| 5  | Frogger (64)                     | Interceptor (-) |
| 6  | Skyhawk (VIC)                    | Quicksilva (4)  |
| 7  | Wacky Waiters (VIC)              | Imagine (3)     |
| 8  | Krazy Kong (64)                  | Interceptor (-) |
| 9  | Attack of the Mutant Camels (64) | Llamasoft (-)   |
| 10 | Escape MCP (64)                  | Rabbit (-)      |

Compiled by Boots. Figures in brackets are last week's positions

# Fly me . . . without a computer

*I think this is one of the funniest cases of the left hand not knowing what the right hand is doing — computer dept, hardware division. I hope humour does not give way to tragedy.*

Recently there has been much hoo-ha about the use of portable computers aboard planes. Apparently some of these guys are thought to be causing or contributing to problems with airplane navigation and communications equipment.

Some portables are being banned from use on some airlines; all portables are being banned on others. The Federal Aviation Association (FAA) is now looking into these issues. The issue is certainly not much ado over nothing; the Federal Communications Commission, which legislates the allowable radiated emissions from computers, set a Class B interference standard which is very close to the level of signals used in navigation.

Even tests done by the Canadian Department of Transport revealed that an electronic calculator interfered with the navigation system of a helicopter when held in close proximity to it (computers generate more interference than calculators). The whole issue is now under investigation.

Meanwhile up in Canada, Canadian Pacific Air, of Vancouver, British Columbia, has started installation of tray size self-contained video games on board flights between Vancouver and Amsterdam. The big difference, however, is that the games use liquid crystal displays and not video display units, which alone contribute greatly to radiated interference. And the units use very little power, which also tends to limit the distance any interference may be radiated.

One of the units used underwent a rigorous study conducted by an independent research agency. The 15-page report gave the unit, called Airplay, a clean bill of health. Even so, plans are underway to introduce more versatile, and therefore more powerful, on-board units.

It is likely that, in lieu of the U.S. studies, much care will be taken before such units are introduced. I certainly hope so.



Two new and interesting pieces of hardware for the VIC-20. Promqueen is being advertised as a very cost-effective ROM development system. It is basically an EPROM programmer in cartridge form. Use of this device allows you to type in your program at the keyboard directly into a 4K ROM emulator.

You can then test your program in circuit, after which you can directly burn an EPROM using the device's programmer and power supply. It comes with a 25-page user manual and fits the expansion port, leaving the user port free. The cost of the device is about \$199 plus shipping and handling.

From the same company comes a low cost network controller compatible with all Commodore PETs and the VIC-20. Petnet provides the capacity to transfer files and programs to and from a central computer to up to 16 satellite computer work stations. Requiring no special software, the unit does not interfere with normal communications port usage, and may be cascaded. Carrying an approximate price of \$625, this device may be readily applied in classroom and other similar situations. Details on both this, the Promqueen, and other products for the VIC-20 can be obtained from Parsec Research, Drawer 1766-P, Fremont CA 94538, (415) 651-3160. All products come with a 10-day trial and a six month warranty.

Out of room again. See you next week.

**Bud Izen**  
Fairfield, California

# It's time for action

Looking for a game to speed up your heartrate? Before you buy, read what our reviewers had to say about these

## Aquaplane 48K Spectrum £6.95

Quicksilva, 13 Palmerston Road, Southampton SO1 1LL

On a golden beach, under a cloudless sky, a long drink in your hand, reading a good book — this is the setting for this novel experience, I hesitate to call it a mere game.

With the sun getting hotter and hotter, the temptation to cool off by going water skiing is too strong to resist.

With your friend at the wheel of a powerful speedboat, you are soon parting the surface of the clear blue sea.

But all is not as tranquil as it seems. Ahead of you are rocks and driftwood, and dodging in and out of them takes consummate skill.

It's also regatta day. With

yachts tacking backwards and forwards across your path, it seems almost impossible to avoid a collision.

After successfully negotiating the regatta, there is even more traffic in the shape of private cruisers. With inebriated spoilt rich kids at the helm, they seem hell bent on your destruction. But if they don't get you, the sharks almost certainly will.

With only three controls, up, down, and increase speed, playing couldn't be easier.

instructions	100%
playability	90%
graphics	100%
value for money	100%



## Dinky Kong Oric-1 48K £6.95

Severn Software, 5 School Crescent, Lydney, Glos GL15 5TA

The advert says "You won't see a better game for the ORIC", but I don't think I will see many as bad.

The instructions (both on paper and screen) are good, but even these hint that the game is not going to be everything that its arcade counterpart is.

In fact, the game has poor graphics, very little sound, and is so fast, even on the first of its nine screens, as to make the game depressingly difficult!

The one and only screen is a mixture of ramps, hearts, barrels, fireballs and umbrellas. You must make your way up the ladders, along the ramps (which are horizontal!), jump over the bar-

rels and fireballs, walk under the umbrellas and over the hearts, and all the time watching that the bonus does not fall to zero!

If you make it to the top of the screen, you get to save your true love. After a couple of zaps the whole thing starts again, but this time with more, faster-moving barrels. Fireballs appear on level four.

The game is written in lo-res mode, and therefore movement is rather less than smooth. Sound during the main part of the game is non-existent, and only a little is heard when the quite neat Hall of Fame is presented.

The game really does not match the standard set by other games for the Oric. **M.C.**

instructions	70%
playability	50%
graphics	30%
value for money	30%



## Caterpillar TI-99/4A (Extended BASIC) £4.50

Firefly, 48 Dorset Street, London W1H 3FH

Whether or not you undergo the final metamorphosis to a butterfly, having survived all 10 rounds of Caterpillar, I'd really like to know — but I didn't last that long!

The pace is certainly furious, and requires lightning keyboard control to save your caterpillar from instant death.

The object is to manoeuvre this creature round the screen to the exit point, munching bonus markers as you go but avoiding all obstacles in your path, not to mention your rapidly growing tail.

Having exited one screen you

move on to the next, which has more obstacles, until all 10 screens have been successfully completed. A score is given for how long you last and for any bonuses taken on the way.

You only have one life, however, so the first false move sends you right back to the start.

For those with the speech synthesiser attached there's a verbal addition to the program.

The instructions are loaded separately from the game itself, but there was no problem in loading either.

A combination of good graphics and exciting action make Caterpillar a good buy for the money. **J.W.**

instructions	90%
playability	90%
graphics	80%
value for money	100%



## Cruising Dragon £6.95

Sunshine, 12/13 Little Newport Street, London WC2R 3LD

Although Cruising is basically just a simple chase game, it's fast and colourful, and I enjoyed it.

Instructions are good and easy to understand, and loading was reliable. A title page is displayed

during loading, and on completion the program auto runs.

The game itself consists of six parts, and I have yet to get fast enough to play parts five and six.

As the parts get harder, more chasers appear. Scoring is shown after each frame has finished, and a time bonus is given to the quick-fingered.

Sound is clear but not excessive. Another good point — if you ignore the "press any key"

prompt, then all the frames are displayed, together with the scoreboard.

All in all, it's a very entertaining tape, that all the family will enjoy. **A.G.**

instructions	80%
playability	90%
graphics	90%
value for money	80%



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Smooth, flicker-free animation can be yours with these two machine code routines — and a short BASIC program — to create, store and display 43 frames.

Each frame can be a picture or text or a mixture of both and all 43 are displayed in under two seconds.

Listing 1 starts at location 30000 in RAM, though it can go anywhere sensible you like. When this routine is called the image on the screen is stored in RAM.

Listing 2 starts at location 30100. When it is called the information stored in RAM is sent to the screen.

Both routines make use of the LDIR instruction in which a block of bytes is copied from one area of memory to another.

As a guide, the assembler listing is given to the right of both routines. The HL register pair holds the base address, the DE pair the destination and the BC pair the number of bytes to be copied.

**How they work**  
**Listing 1**

The relationship between the display file (16384-22527) and the picture on the screen is not straightforward. To allow for this, two loops — one nesting inside the other — are used.

One uses a A register as a counter and is for 64 cycles and uses locations 30006 and 30019.

The other loop uses the B register and is for 20 cycles. It uses locations 30013 and 30016.

Changing the values of the loop counters (at 30020 and 30014) can give interesting effects.

Location 30005 holds the destination address. As each frame is created and stored, the contents of this location must be increased accordingly. Since each frame uses 768 bytes, the contents of this location must be increased by 768/256 for each frame (i.e. by three). This is done in the BASIC program, line 110.

In the first listing the base address is that of the display file (the screen picture) and the destination address is the free memory in RAM.

In the second listing the base address is in RAM and the destination address is the display file (i.e. the screen).

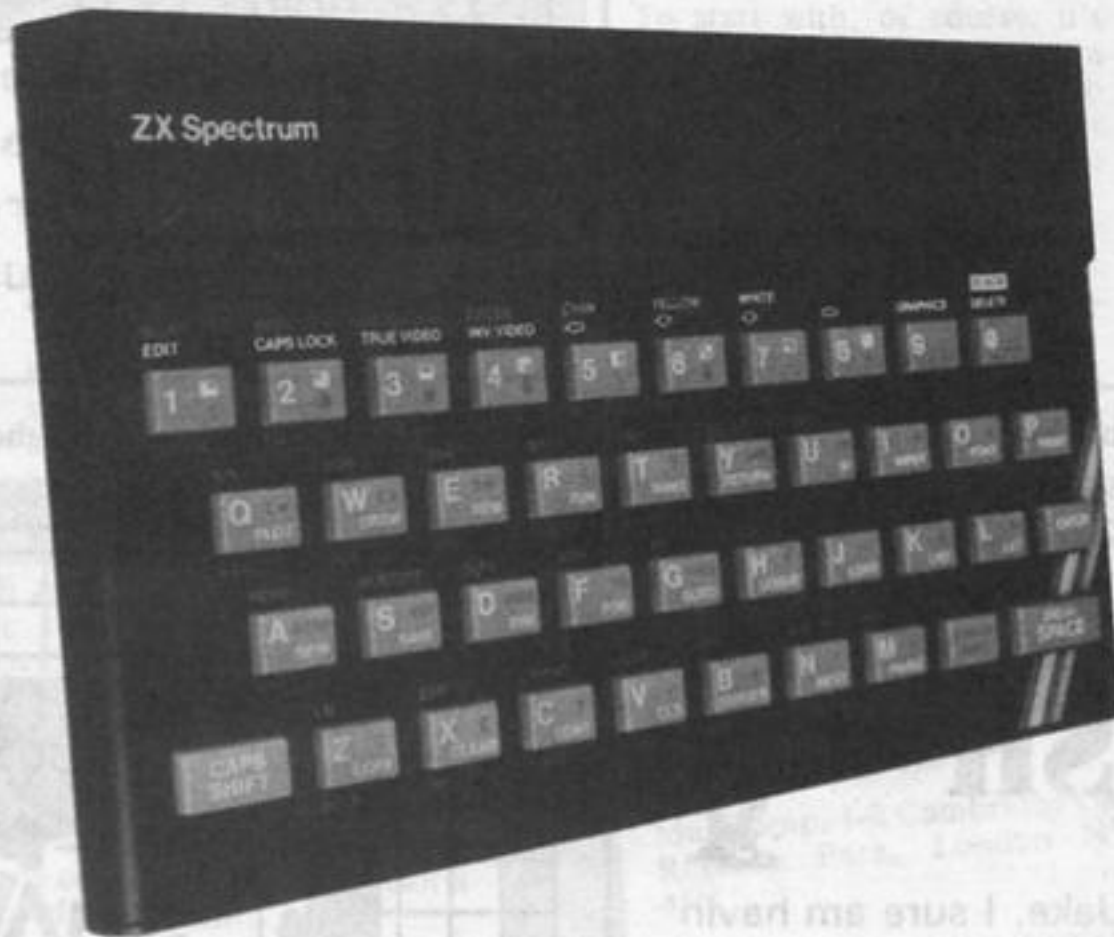
It is very easy to make each frame the same size as the screen. But this would mean that each frame would use up 5632 bytes — 32 columns of 22 lines by eight.

Since there are approximately 34000 bytes available in RAM to store the frames, only six frames would be possible.

So to increase the number of frames available I have made them smaller.

# Make your own flicker-free movies

Try these machine code routines in your own programs for smooth animation. Ian McDonald wrote them and explains their use on the 48K Spectrum



Each frame is a rectangle in the centre of the screen whose co-ordinates are (80,48), (80,111), (175,48), (175,111).

The listings are in hexadecimal and can be entered any way you like, either directly, or by using READ, DATA and POKE statements.

After you have entered the two routines you can test them by carrying out the following:

- Fill up the screen with text. A quick way is with a short BASIC program, LISTed several times
- RANDOMIZEUSR 30000. The screen will look the same, but the "frame" in the middle should now be stored in RAM from location 32000 on
- CLS to clear the screen
- RANDOMIZEUSR 30100. The rectangle in the middle of the screen should now be full of your text

If it all works all right type in

listing 3, the BASIC program. When this is RUN you will see a circle in the centre-left of the screen. It will disappear and then reappear slightly to the right 43 times.

Then you should see the circle move smoothly from left to right over and over again. Press SHIFT and BREAK when you're bored.

The size of the frame is easily changed by altering the values in locations 30009, 30014 and 30020.

The values of 30009 and 30014 should add up to 32. Why? Because one line of screen picture uses 32 bytes.

If you change the value in location 30009, you must also change the value in location 30109. This applies to changes of any values.

The number of bytes used for each frame is equal to the number of columns across multiplied by the number of pixels up. As you increase the size of each frame, you increase the number of bytes per frame, thus decreasing the number of frames possible.

**Listing 2**

This listing is the same as listing 1, except:

- It starts at 30100
- The DE and HL addresses are exchanged
- In 30115, the DE pair is increased, not the HL pair

Location 30102 holds the base address. As each frame is shown, the contents of this address must be increased by three. This is done in line 210 of the BASIC program.

The size of the STEP in lines 100 and 200 is equal to the number of bytes per frame divided by 256. If the result of this division is not a whole number, locations 30004 and 30102 will also need POKEing.

The formula given on page 173 of the Spectrum manual could be useful in working out the values to be POKEd.

**Listing 3**

- 10-20 B1 and B2 contain the start address for each frame
- 30-50 CX, CY are the co-ordinates of the centre of a circle
- 100-110 the value of the contents of B1 is increased by three for each frame. If the upper limit of 251 is raised the program will crash
- 120 draws the circle
- 130 the frame is stored in RAM
- 140 clears screen ready for next page
- 150 moves circle slightly to the right
- 160 loops back to 110
- 200-210 as for 100-110, except for B2, not B1
- 220 frame is displayed
- 230 loops back to 210
- 240 repeats 200-230 indefinitely

The frame displayed will use the current permanent INK and PAPER values. If you design frames that contain colour they will only be displayed in plain black and white, or green and yellow, or whatever.

With a bit of modification the contents of the attribute file (22528-23295) can also be stored in and extracted from RAM. In this case glorious Technicolour is possible, though at the expense of a few frames.

**Hints on conversion**

It should be possible to use these routines on a 16K Spectrum by locating them lower down in memory and by changing the upper and lower limits in the FOR...NEXT statements in lines 100 and 200. Fewer frames will be available.

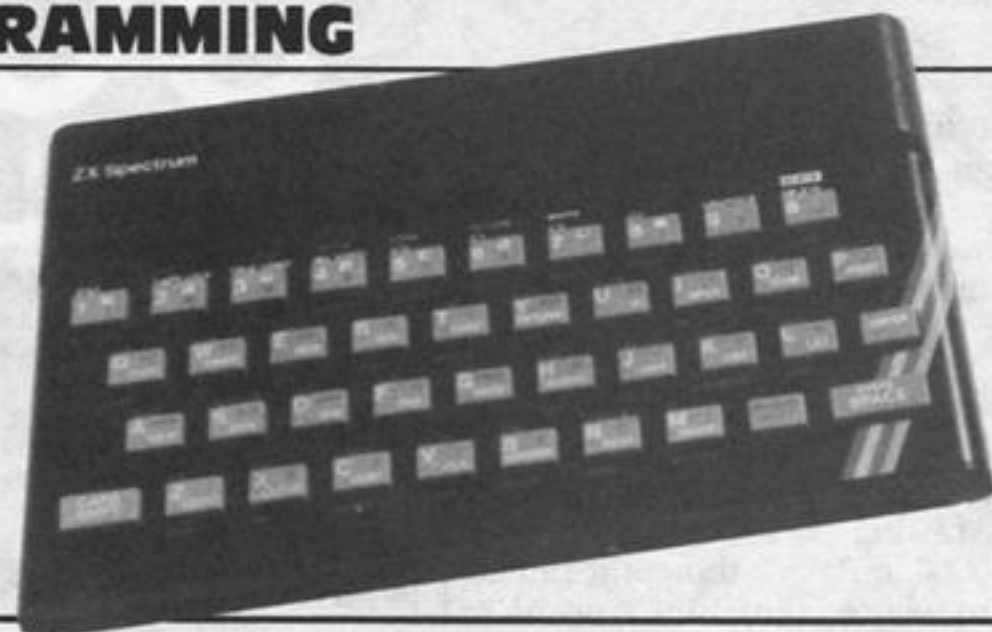
The machine code routines are Z80A based and make use of the Spectrum's display file peculiarities. This would make conversion to other micros rather difficult.

## SPECTRUM PROGRAMMING

```

30000      33  0  72  LD HL, display file
30003      17  0 125  LD DE,32 000
30006      62  0     LD A, 0
30008       1 12  0   LD BC,12
30011     237 176     LDIR
30013       6  20     LDB,20
30015      35     INC HL
30016      16 235     DJNZ
30018      60     INC A
30019     254 64     CP 64
30021      56 241     JRC
30023     201     RET
    
```

Listing 1 — stores frame in RAM. The memory locations are the five-figure numbers on the left and the assembler listing is in letters on the right. They should not be typed in



```

1 PAPER 1: BORDER 0: INK 7: B
RIGHT 1: CLS : PRINT AT 10,5: FL
ASH 1; "WAIT-MORE LOADING TO COME
"
2 LOAD ""CODE 30000,200
3 CLS : PRINT AT 10,1: "OK - PR
ESS ANY KEY TO CONTINUE"
4 PAUSE 0: CLS
10 LET b1=30005
20 LET b2=30102
30 LET cx=80
40 LET cy=20
50 LET r=25
100 FOR p=125 TO 251 STEP 3
110 POKE b1,p
120 CIRCLE cx,cy,r
130 RANDOMIZE USR 30000
140 CLS
150 LET cx=cx+3
160 NEXT p
200 FOR p=125 TO 251 STEP 3
210 POKE b2,p
220 RANDOMIZE USR 30100
230 NEXT p
240 GO TO 200
    
```

Listing 3 — a BASIC program showing how the two machine code routines can be used

```

30100      33  0 125  LD HL,32000
30103      17 10  72  LD DE,display file
30106      62  0     LD A, 0
30108       1 12  0   LD BC,12
30111     237 176     LDIR
30113       6  20     LDB,20
30115      19     INC DE
30116      16 253     DJNZ
30118      60     INC A
30119     254 64     CP 64
30121      56 241     JRC
30123     201     RET
    
```

Listing 2 — puts frame on screen. Do not type in the memory locations or the assembler

# CALIFORNIA GOLD RUSH



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HCW33

## Harrier Attack Oric-1 £6.95

Durell, Castle Lodge, Castle Green, Taunton TA1 4AB

In this arcade-style game, you control a Harrier aircraft in an attack on an enemy controlled island.

You have to take off from an aircraft carrier, and fly towards the island.

Patrol boats, enemy aircraft, and flak are the first hazards you will encounter.

From then on, the enemy will attack you in several ways, while you attempt to carry out your mission, to destroy their base.

On the way, you pick up points destroying enemy aircraft and equipment.

And you have to keep a check on fuel, bomb, and rocket levels, to enable a safe return to the carrier.

In style and appearance the

game is reminiscent of simpler versions of Defender. There are five levels of difficulty, hard to impossible.

The use of colour and sound are good. One feature I thought was excellent was the facility to adjust the sound volume.

Some of the graphics are odd. When you fly through the smoke cloud left by flak, your Harrier doesn't reappear when it should. And when a rocket is fired, everything stops moving for a moment.

It's a pity this machine code program is stored at Oric's slow speed only — it took a frustrating 10 minutes to load. However, the enjoyable game was worth the wait. **D.N.**

instructions	90%
playability	80%
graphics	60%
value for money	80%



## Bandits at 3 o'clock BBC B £6.95

Program Power, 8/8a Regent St. Chapel Allerton, Leeds

Computer games can be fairly antisocial, but this program is for two players. True, you can

run it for one, but that's really a training session.

The whole package is well presented; an attractive information insert card with the tape, clear instructions and good use of graphics.

The idea is simple enough — it's a two-plane dogfight — and simple ideas often produce the best games.

To start with, of course, it's murder remembering that a plane joystick works in reverse to a normal computer joystick. For example, the plane dives when you push the joystick up.

Then as well as your opponent, you can choose to add further hazards such as flak or airships.

Flak can destroy either plane, but the two airships are partisan, and only fire at the opponent's

plane if it ventures too close beneath.

All in all, this game is a worthy addition to anyone's collection. **B.J.**

instructions	90%
playability	85%
graphics	82%
value for money	85%



## Copter Captive TI-99/4A (Extended BASIC) £7.95

Byteware, Unit 25, Handyside Arcade, Newcastle upon Tyne NE1 4PZ

There are two stages to Copter Captive. Only after completion of the first part may you continue to the next.

Your mission is to rescue parachutists following an alien attack. Unfortunately, you have been taken captive, so must first escape by locating four keys, one at a time, to open the doors or your prison.

The keys are placed in a simple maze on the left and right of the screen; in the middle are the doors guarded by robots.

The captive appears at the top

left and is controlled by the cursor keys. Once he has started moving, theoretically, he will not stop until safely reaching a key or door.

I was able to freeze the action, however, by any key other than those used in the game, which made control much easier than it should have been.

If the captive crashes into a wall or is caught by a robot, the game begins again with a different set up.

Having gained freedom, stage two starts immediately, back in the helicopter. Your flight must be controlled in order to avoid the alien craft, yet catch as many parachutists as possible. **J.W.**

instructions	90%
playability	90%
graphics	100%
value for money	100%



## Battle of Britain VIC-20 plus 16K £9.50

Maincomp, 1-2 Cambridge Gate, Regent's Park, London NW1 4JN

This program is of the simulation type my favourite. The idea is that you play the part of the guy running Britain's defences against the Bosch.

You control the activities of 12 sectors, and try to develop a winning strategy.

Each sector has a squadron of aircraft which you scramble as required.

As aircraft are destroyed you must manipulate the resources of each sector to produce new aircraft.

I found the game difficult to

get into, mainly due to the poor instructions. Some of the commands appeared not to work as expected.

A number of times I committed the resources of a sector to production only to lose the resources without gaining any aircraft. Once I somehow gained a 0.25 of an aircraft (and I got it to fly!).

Overall, a rather disjointed game which offered a lot but didn't deliver all the goods.

The game was purely textual, which was a pity. A map of southern England would have been nice. **A.W.**

instructions	60%
playability	60%
graphics	n/a
value for money	55%



## Paratroopers VIC-20 £5.99

Rabbit, 380 Station Road, Harrow HA1 2DE

This is one of the best examples of user-defined graphics that I have seen, along with excellent sound effects, and a quite repulsive game.

Lovely little helicopters fly in from each side, with highly realistic helicopter noises. Little men jump out, and parachutes open on their backs.

The "fun" element of this game consists of shooting them as they drift down. If you shoot their parachutes off, their arms and legs flail as they plummet to a landing accompanied by a splat noise.

It really is a shame that programming of this extraordinary standard should be wasted on a "game" that is an obscene celebration of slaughter.

Rabbit are in my opinion grossly irresponsible in releasing this kind of stuff into a market populated largely by children. Human life is a precious commodity and to represent its destruction as a game is to insult those who possess it. **T.M.**

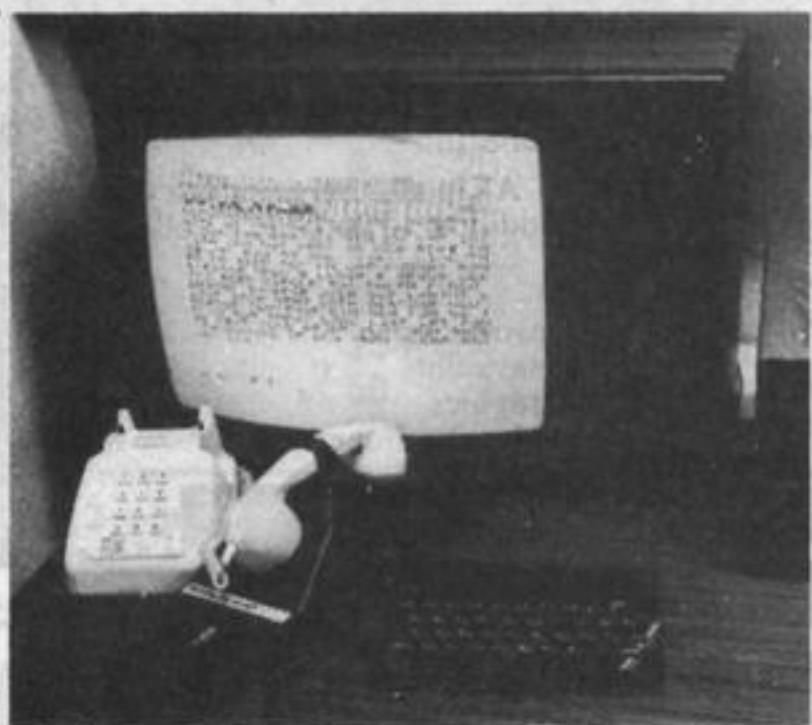
instructions	60%
playability	0%
graphics	99%
value for money	0%



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| Mission Mercury | Envahi         |
| Creepers        | Yomp           |
| Starfire        | Golf           |
| Sheepwalk       | Lojix          |
| Racing Manager  | Lost           |
| Quetzalcoatl    | Robber         |
| Spectron        | The Island     |
| Angler          | Ghost Town     |
| Rider           | Killer Caverns |
| Death Cruise    | I Ching        |

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- |                  |            |
|------------------|------------|
| Castle Adventure | UXB        |
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| Space Adventure  | Trench     |
| Owzat            | Chieftain  |
| Microbe          | Plankwalk  |
| Cruncher         | Noc a Bloc |
| Robopods         | Fun-Pac    |

You may enter as many times as you wish, provided each entry is on the official coupon — not a copy — and in a separate envelope.

Post your entry to Virgin Competition, Home Computing Weekly, 145 Charing Cross Road, London WC2H 0EE.

Entries close at first post on Friday November 4.

The winners will be the first 40 correct entries opened, regardless of computer.

The solution and the names of the winners will appear in the news columns of Home Computing Weekly and the prizes will arrive from Virgin Games within 28 days of that issue.



### The small print

The first 40 correct entries drawn will win the prizes. Coupons which are not fully completed and envelopes without the number of differences found on the back will not be considered.

Closing date is Friday, November 4, 1983.

Entries will not be accepted from

employees of Argus Specialist Publications, Virgin Games and Alabaster Passmore & Sons. This restriction also applies to employees' families and agents of the companies.

The winners' names and the solution will appear in Home Computing Weekly. The editor's decision is final and no correspondence will be entered into.

## Virgin Games Competition

### Entry Coupon

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Computer \_\_\_\_\_

Number of titles found \_\_\_\_\_

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Closing date: first post, Friday November 4

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P I E I E K I L L E R C A V E R N S J P  
O P A O U R O F X W S T P B N G O D E R  
D O U Q L E N G T R B O P I C T C O V D  
S C L U Y I M I C R O B E E H S A L Y L  
X U N E D D E N V A H I V A P O B F A G  
V D I T O A R H F D S T I N G W L Z L R  
P C E Z O Y C B D O E M C O Y O O O T Y  
Q F V A F Q U X B X I A F T G F C G S J  
U H I L W M R X E R V N R P V U T O Q T  
V N I C K C Y C I S U I C H I N G R O F  
N P D O N H K O I N S A I W R I S P U I  
T O U A S T W N M W T S L L G P T B W N  
R M E T L Z A T I P L A N K W A L K U M  
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# MR. CHIP SOFTWARE

## VIC 20 GAMES AND UTILITIES

### JACKPOT

This is it, the ultimate Fruit Machine for the VIC with nudge, hold and respin 100% machine code. "Overall Jackpot is a beautifully written simulation giving superb graphics, animation and use of colour. In fact, this program makes Commodore's Fruit Machine cartridge look unbelievably cheap & nasty." Home Computing Weekly No. 20 19/7/83 ..... £5.50

### KWAZY KWAKS

Accuracy and speed are required for this Shooting Gallery, superb use of colour & graphics in this new and challenging game from the author of **Jackpot**. 100% machine code, joystick or keyboard control ..... £5.50

### PACMANIA

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# Writing for the new generation

**A birthday present and a redundancy started Malcolm Evans of New Generation on a new career. Candice Goodwin found out how he lost a job — and gained a software company**

Back in 1981 when the ZX81 had just been hatched, software standards were generally pretty low. Once exception to this rule was a program called 3D Monster Maze, which has been a firm favourite with ZX81 owners since it first appeared in November 1981.

Monster Maze was, according to its creator Malcolm Evans, the first-ever true 3D game for the ZX81. As you travel along the passages of the maze, they appear on the screen as you would see them in real life — and every now and then an ominous speck at the end of a long corridor, getting larger and larger every second, warns you that you're about to be eaten if you don't escape from the monster quickly.

Even now the ZX81 has been overshadowed by more sophisticated home computers, the graphics on Monster Maze still look good. To Malcolm Evans, programming within the limitations of machines like the ZX81 is a challenge. "My aim is always to come up with something completely different", he said. "None of my games are direct copies of arcade games."

Malcolm now runs New Generation Software, but when he wrote Monster Maze, he was working full time for the microprocessor applications group at Sperry Univac. He took up ZX81 programming as a hobby, after his wife Linda bought him a ZX81 for a birthday surprise.

The birthday surprise turned out to be more useful than Linda had imagined. A couple of weeks after Malcolm had his first big order for Monster Maze from Smiths, he was made redundant from Sperry, and went into home computer software full time.

Compared to his work at Sperry, he finds games programming "very relaxing and enjoyable. Trivial? It depends on how you look at it. I approach it from the point of view of pushing the machine to its limits. My 1K version of Breakout for the ZX81 was originally an exercise to see how much could be done in 1K. The people at Smiths couldn't believe it."

At first, Malcolm was a partner in J. K. Greye software. Then last September he formed New Generation. Why New Generation? "Well, it's mainly the new generation buying software, isn't it?", Malcolm explained.

Until last June, Malcolm ran the company alone, as well as doing all the programming, with some help from his wife. Then his brother Rod, "the family business expert", joined him and took over the commercial side.



Malcolm says he used to spend seven hours a day running and business, and seven hours programming, but finds that "now I spend all 14 hours programming — it doesn't seem to have given me any more free time. The programs aren't coming out any faster, either, but they're getting more complex. After all, I don't want to produce something that computer owners could write for themselves."

He has written all seven of New Generation's programs, three for

the ZX81 and four for the Spectrum, and each has taken him two to four months. In each new game, he tries to use new programming techniques, building on methods used in previous games.

"For example, I took the concept of the train that you see in 3D Tunnel and developed it in my latest program, Genon", he said "I particularly like 3D effects — they bring the player into the game."

Like Monster Maze, Genon is a maze game, but with circular corridors and doors that open and close. The aim is to get into the centre and crack the code set by a hostile computer, hell-bent on stopping you. On the way, you're chased by a monster called Bogul "who does the most revolting things to you if he catches up with you."

Then when you do manage to break the code, you have to get out again — but now Bogul has cloned...

Malcolm is now writing exclusively for the Spectrum, partly because it's such a big market — each of his Spectrum programs has sold 30,000 copies — and partly because distributors will no longer take ZX81 software. But he says: "I almost prefer the ZX81 to the Spectrum, because it's more flexible."

"You can do things, like switching screens by using display files, that you can't do with the Spectrum, and I haven't found that the Spectrum has any major advantages to make up for the disadvantages. From the programmer's point of view, colour and sound are just two more things to worry about."

He actually writes his program not on a Spectrum or a ZX81 but on a Sharp MZ80B, because of its large (64K) memory, good editor and assembler, and fast disc system. "If I run the program and it crashes, I don't have to wait for ages to reload it from tape", he said.

Malcolm finds that, despite the long hours he puts into programming, life is a lot easier now than in the early days of the business, when he had to deal with mail order as well as everything else. "Our turnover's doubling every month now, and we're doing less than we used to," he grins.

By using distributors, he doesn't even have to negotiate with shops — and now he finds his programs turning up in some unexpected places. "Would you believe it, I recently saw our programs on sale in Carrefour."

He sees the danger that distributors may start to call the tune in terms of both prices and program content, but reckons, "the important thing is to get into as many distributors as possible, and create a demand for your product. People go into shops and ask for games, and it gets back to the distributors."

Another reason why the pressure is easing is a recent move to a 100-year-old house at 15 Sunnysbank, Lyncomb Vale, Bath. In the grounds of the house is a coachhouse that Malcolm's had renovated for use as an office. "It's a lot better, he says. "Now I can just roll out of bed and straight into work."

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*THE QUILL* is a major new utility written in machine code which allows even the novice programmer to produce high-speed machine code adventures of superior quality to many available at the moment without any knowledge of machine code whatsoever.

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This demo-cassette is available at £2.00, and *THE QUILL* itself at £14.95.

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## How you can crack the code

What can these assemblers, disassemblers and monitors do for you? Our reviewers tell all

### Oric-1 Extension Monitor 48K Oric £15

Kenema Associates, 1 Marlborough Drive, Worle, Avon BS22 0DQ

This useful and easily-managed package is, Kenema promises, the first of a long line of computer

language extension monitors.

The monitor assumes a prior familiarity with the techniques of programming in assembler or machine code, and is not intended as a guide to assembly language programming.

The neat, comprehensive manual supplied with the package is very easy to read and understand. Screen display has been well thought out, and lower case entries and a printer facility are provided.

I tried testing the monitor with some short machine code routines, and was impressed with the smoothness and speed of operation. The program resided just below the Oric hi-res display, which seems a sensible location, allowing free access of other programs to most of the 48K RAM.

I have some doubts about the monitor's value for money at

labels of any length, which is most useful when writing a large M/C program.

It gives a comprehensive range of error messages, short, but to the point.

All the mnemonics in the 6809 instruction set are supported, and the cartridge comes with a handy instruction set reference card.

A simple-to-use assembler, D.A.S.M. automatically returns to BASIC after assembling your program. Also useful is its ability to output on to a printer instead of just the screen.

In conclusion, easy to operate, simple to learn and good value.

C.G.

instructions	75%
ease of use	85%
display	65%
value for money	85%



£15. However, it arrives at a time when software support for Oric is still sparse, and is thus a welcome addition to the machine code programmer's library. P.W.

instructions	90%
ease of use	85%
display	85%
value for money	60%



### Full Screen Editor/Assembler Spectrum £9.95

Oxford Computer Publishing, PO Box 99, Oxford

This is the most powerful machine code programming tool I have seen. Coupled with the Machine Code Test Tool package from the same company, it would give a very comprehensive machine code environment.

The package operates in two parts. (In the 16K version, each part loads separately, information from one part being retained for use by the other.)

The first part, the editor, allows you to enter your program in mnemonic form with data,

branch addresses etc represented by symbols.

At your disposal are commands to examine and modify lines of source code; to move, copy and delete single lines or blocks as a whole; to locate, change or delete specified strings of characters, as well as commands to output text to the ZX printer or cassette.

Many of these facilities I have previously only seen offered on sophisticated word processors.

Switching to the second part, the assembler, which converts the source code into object code (the form understood by the Z80 microprocessor), is a simple matter.

This object code can be displayed to screen, SAVED to cassette tape, stored in memory, and a hard copy taken, all under your control.

The assembler makes two passes through the text buffer.

### Assembler/disassembler Oric-1 £6.95

Durell, Higher Combe, Combe Florey, Taunton, Somerset

Two BASIC programs on one cassette.

The assembler program occupies over 10K, so just fits the 16K Oric when GRAB is used.

When you start, the program asks you to specify the number of lines and labels you intend to use. Following this, standard assembly language instructions are entered through the keyboards.

The assembler has several useful facilities; addresses and lines may be labelled, editing is possible with commands such as DELETE, INSERT, and ALTER. There is a provision to include data in the listing.

When complete, the assembly

language listing is converted to machine code in a single pass; any syntax errors are reported, and must be corrected, before assembly is allowed to continue.

One major failing of the program is that there is no way to save the assembly language listing on tape, but you can dump a listing on to a printer.

The disassembler converts machine code to assembly language. Output to either screen or printer can be selected, and the information given includes the opcode addresses and values together with the assembly language mnemonic and operand.

D.N.

instructions	60%
ease of use	60%
display	50%
value for money	80%



The first checks the system and constructs a table of symbols and their values. The second assembles the object code using the table to calculate the values of numeric and symbolic operands.

The syntax checking is comprehensive, giving a list of error messages similar to those given by the BASIC interpreter.

The manual is highly detailed (even to the extent of explaining

how to plug in your computer!), and goes through the operation of each part of the programs using the demonstration file of data supplied on the cassette.

The assembler also has a powerful expression evaluator and has available pseudo-opcodes — directives to the assembler to perform specific operations.

Also included on the cassette is a machine code UDG-creating

program. This is similar to the one on the Horizons tape, but much faster.

C.B.

instructions	85%
ease of use	90%
display	90%
value for money	100%



# Find that program faster

Prog File runs on a 16K Spectrum and it is very useful for providing a handy reference for the position of specified programs on a cassette.

A menu will appear giving you seven options. After making a list, new programs can be added and old ones removed.

A program can be searched for or the list reviewed and after alteration the program can be saved again.

## Variables

TS main name array  
 S tape start no. array  
 F tape finish no. array  
 X used as subscript for TS, S and F  
 C also used as subscript for TS, S and F  
 N used to run program to specification, eg. 1030 N is used to tell the computer how many times to go round the input loop (1040-1060)  
 NS used as for N but for strings, eg. 4010 N is used to instruct the computer which program name to search for

Sick of searching your tapes for a particular program? Rhys Davies was, so he wrote Prog File for his 16K Spectrum

You could add a sort routine. On re-LOADing do not type RUN — this will wipe the arrays. Instead type GOTO 10 to start the program from 10 and

## How it works

1 DIMension array  
 10-90 set up menu, select function  
 1000-1070 set up new list  
 2000-2080 add new program to list. 2020 reads the string to the first three letters  
 3000-3050 search for program name  
 3500-3530 display list of program names  
 4000-4080 removal of program name from list  
 5000 exit from program  
 6000-6010 save list on tape

thus not re-DIMensioning the arrays.

Note: Line 3025, after the colon, should read PAUSE 300:GOTO 3000

```

1>DIM T$(256,10): DIM S(256):
DIM F(256)
10 REM "TAPE START"
15 CLS
20 PRINT "** MENU **"
30 PRINT "1) INITIATE FILE"
40 PRINT "2) INSERT NEW PROGRAM"
..
50 PRINT "3) SEARCH FOR PROGRAM"
..
55 PRINT "3.5) REVIEW LIST"
60 PRINT "4) REMOVE PROGRAM"
63 PRINT "5) EXIT PROGRAM"
64 PRINT "6) SAVE THIS LIST"
65 FOR A=1 TO 5: PRINT : NEXT
A
70 PRINT "TYPE NUMBER CHOSEN :
1,2,3,4,5,6"
80 INPUT B
85 CLS
90 GO TO B*1000
1010 PRINT "YOU HAVE BEEN ALLOWED
D 256 NAMES EACH 10 CHARACTERS LONG"
1020 PRINT "HOW MANY PROGRAM NAMES
WOULD YOU LIKE TO ENTER NOW?"
..
1030 INPUT N
1035 PRINT "INPUT NAME (MUST HAVE
MORE THAN 3 LETTERS ) THEN START
AND FINISH OF THE PROGRAM"
..
1040 FOR X=1 TO N
1050 INPUT "NAME ";T$(X): INPUT
"START ";S(X): INPUT "FINISH ";F
(X)
1060 NEXT X
1070 GO TO 10
2000 LET C=0
2010 LET C=C+1
2020 IF T$(C, TO 3) <> " " THEN
GO TO 2010
2030 PRINT "HOW MANY NEW PROGRAM
S WOULD YOU LIKE TO ADD TO THE L
IST"
2040 INPUT D
2050 FOR X=C TO C+D-1
2060 INPUT "NAME ";T$(X): INPUT
"START ";S(X): INPUT "FINISH ";F
(X)
2070 NEXT X
2080 GO TO 10
3000 PRINT "WHAT IS THE NAME OF
THE PROGRAM"
3005 INPUT Z$
3007 IF LEN Z$<3 THEN GO TO 3005
    
```

```

3010 LET C=0
3020 LET C=C+1
3025 IF C=257 THEN PRINT "PROGRA
M NOT FOUND !!": GO TO 10
3030 IF T$(C, TO 3) <> Z$( TO 3) T
HEN GO TO 3020
3035 CLS
3040 PRINT T$(C): PRINT "START "
;S(C): PRINT "FINISH ";F(C)
3045 PAUSE 500
3050 GO TO 10
3500 FOR X=1 TO 256
3510 PRINT T$(X),S(X); " " ;F(X)
3515 IF T$(X, TO 3) = " " THEN P
AUSE 500: GO TO 10
3520 NEXT X
3530 GO TO 10
4000 PRINT "WHAT IS THE NAME OF
THE PROGRAM THAT YOU WISH TO REM
OVE?"
4010 INPUT N$
4015 IF LEN N$<3 THEN GO TO 4010
4017 FOR R=1 TO 5: PRINT : NEXT
R: PRINT " PROCESSING"
4020 LET C=0
4030 LET C=C+1
4035 IF C=257 THEN PRINT "PROGRA
M NOT FOUND !!": GO TO 10
4040 IF T$(C, TO 3) <> N$( TO 3) T
HEN GO TO 4030
4050 LET T$(C)=T$(C+1)
4051 LET S(C)=S(C+1)
4052 LET F(C)=F(C+1)
4060 LET C=C+1
4070 IF C=256 THEN GO TO 10
4080 GO TO 4050
5000 STOP
6000 SAVE "PROG FILE"
6010 GO TO 10
    
```



# sinclair special

5



*Inside...  
New Interface 2  
and ROM cartridges!  
New Software!*

## TAKING NEW SOFTWARE IN NEW DIRECTIONS

You'll see that this issue of Sinclair Special devotes considerable space to software. Why, when we've so much to say about hardware and peripherals? Simply because at Sinclair we believe in supporting first-class hardware with first-class software.

This month sees the start of a new commitment to education in our catalogue, both for adults and children.

In the field of micro theory, we've programs like Beyond BASIC and Make-a-Chip, which take you from the creation of simple ZX<sup>®</sup> assembler subsets to simulated circuit design projects.

There's Musicmaster, to teach you music terminology, note values and composition.

And if you're keen to beat your Spectrum at chess (which can be hard), you'll certainly want to try Chess Tutor 1, the first program in a complete chess masterclass.

### Coming soon...

In the pipeline are many new releases, some of which break completely new ground. LOGO and micro-PROLOG for instance. They're fifth generation languages which will take you and your Spectrum closer than ever before to the creation and application of artificial intelligence.

A formal agreement between Sinclair and Macmillan Education has been announced, the first results of which will be published this autumn. These consist of five programs in a complete early reading course plus the first four of a series of programs based on Macmillan's top selling Science Horizons Scheme. All programs are designed for use in schools or the home.

And with Blackboard software, we're publishing six more home education programs for primary school children. Covering alphabet, spelling and punctuation, each of these programs is a true gem, unlike any other education software, and fascinating to run. Even for adults!

I believe that these new titles represent a major advance in educational software for the home.

### New ROM software too!

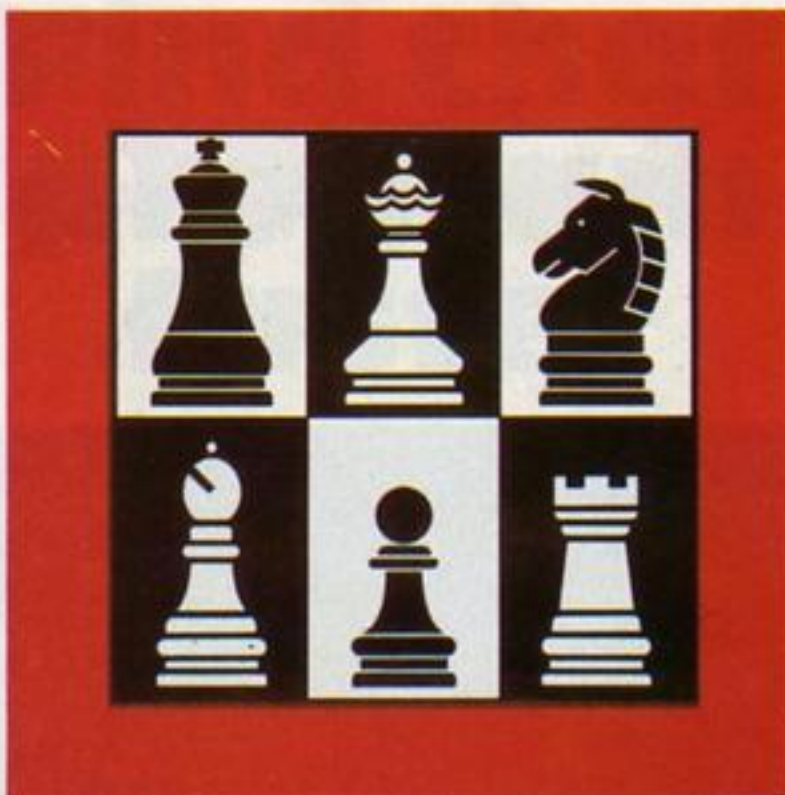
You may well have heard news of ZX Interface 2<sup>®</sup> and ROM cartridge programs. You'll find full details of the Interface and its software on the facing page (and there's an order form on the back page too!). These offer an instant games playing facility at unbeatable prices, and expand the possibilities of using your Spectrum in yet another direction.

*Alison Maguire*

Alison Maguire  
Applications Software Manager

# SOFTWARE UPDATE

## The latest cassette software for ZX<sup>®</sup> Computers



### Chess Tutor 1 For 48K RAM Spectrum. £9.95.

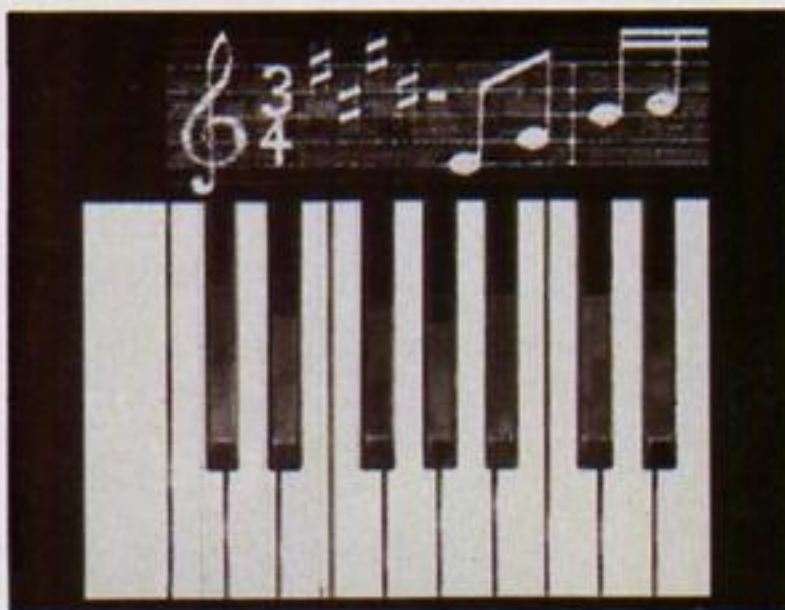
Chess Tutor is a new way of learning all about chess - using your ZX Spectrum.<sup>®</sup>

It starts from the beginning by teaching you about the chess pieces and the way they move - including castling, en passant, promotion, check, checkmate, stalemate and perpetual check.

Then it teaches you the basic tactics - pins, forks, double attacks and skewers.

There are over 120 exercises and over 200 questions for you to answer - with demonstrations and hints from your ZX Spectrum when you want them.

You can choose which parts of the course you want - and even experienced players may be surprised at what they can learn from Chess Tutor.

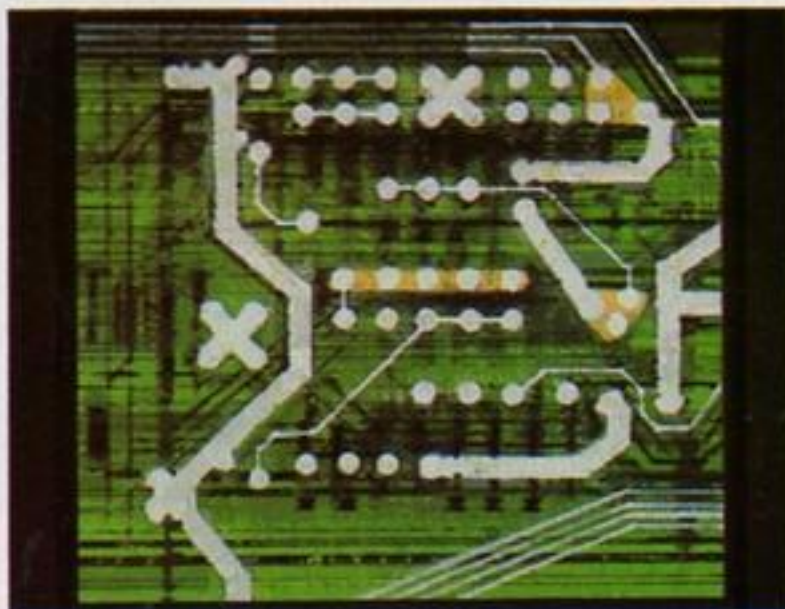


### Musicmaster For 48K RAM Spectrum. £9.95.

Musicmaster turns your ZX Spectrum into a musical instrument which will not only play tunes, but will also demonstrate key signatures, durations of notes, and scales.

You can write your own tunes - in any key - play them over and over again, save them on tape, modify them.

You can either write your music on a staff, or place a simple overlay on your Spectrum for a 17-note keyboard.



### Make-a-Chip For 48K RAM Spectrum. £9.95.

Make-a-Chip teaches you the basic elements of circuit design, shows you how they fit together, and then lets you design and test your own circuits.

When you have designed a circuit, you can give it inputs and outputs and your ZX Spectrum will check it for you. Then it will run it, or tell you what's wrong so that you can modify it.

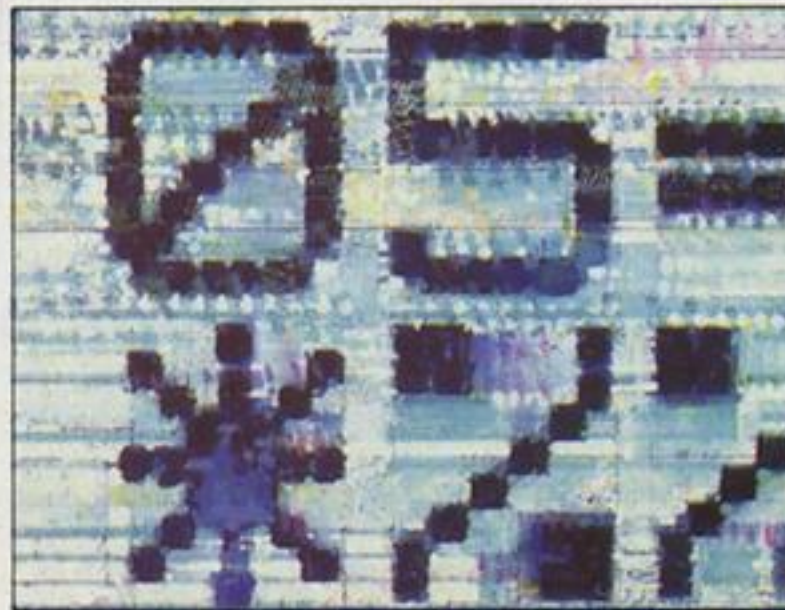
Make-a-Chip is a fascinating way of finding out how computer logic works.



### Print Utilities For 16K and 48K RAM Spectrum. £9.95.

Increase the printing and display facilities of your ZX Spectrum with the Print Utilities program.

Print Utilities enables you to enhance your programs by generating characters of eight different sizes which you can place anywhere on your screen.



### Beyond BASIC For 48K RAM Spectrum. £9.95.

Takes the agony out of assembler. Takes the mystery out of machine code.

Beyond BASIC gives you a deeper insight into the workings of your ZX Spectrum. It explains what happens inside your micro when you run a program, and it teaches you simple Z80 machine code programming.

A major feature of Beyond BASIC is that it enables you to write your own Z80 assembler programs - then you can actually see on your screen how they affect the ZX Spectrum memory and registers.



# ZX INTERFACE 2<sup>®</sup>

## The New ROM Cartridge/Joystick Interface

**Loads programs instantly!  
Takes two joysticks!  
Just plug-in and play!**

The ZX Interface 2 is the latest new peripheral for the ZX Spectrum<sup>®</sup> system. It enables you to use new ZX<sup>®</sup> ROM cartridge software: plug-in programs that load instantly. It allows you to use two standard joysticks, without the need for separate, special interfaces.

To use new ZX ROM cartridge programs, just connect Interface 2 to the rear of your Spectrum or Interface 1 and plug in the cartridge of your choice. The program is then loaded, ready to run!

You can use any joystick that has a 9-way D plug. Use one or two of them for extra fun with ZX ROM cartridge or Sinclair cassette programs – or with dozens of other Spectrum-compatible programs!



**£19.95**

SEE BACK PAGE FOR  
ZX INTERFACE 2  
AND  
ROM CARTRIDGE  
ORDER FORM!

## ...AND BRAND NEW ROM CARTRIDGE SOFTWARE!

There's already plenty of choice of ZX ROM cartridge programs for your Spectrum. Some are old favourites, in an exciting new form. Others are new.

And now, thanks to ROM cartridge technology, you can run them *all* on a 16K RAM Spectrum, even if they were originally written only for 48K machines!

Every ROM cartridge program loads fast and faultlessly. No wires, no waiting, no worries about loading errors! All of them are affordably priced too, at £14.95.

### New! PSSST



Robbie the Robot sits in his garden. Help him fetch compost to cultivate his prize Thyrgodian Megga Chrysanthodil. Help

him make the right choice of pesticide, to ward off devilish insects. Stop the insects breeding to overwhelming numbers before Robbie's plant has bloomed. PSSST is horticulture with a horrendous twist!

One and two player option, with a host of features including sound effects.

### Chess



This sophisticated program does everything you'd expect at board game level, and much more besides.

The high-resolution chessboard and pieces are arranged in a row and column system, so it's easy to key in your moves.

At any stage of the game you can request the computer to suggest a move, reverse roles or change the level of skill.

Full-colour high-resolution graphics.

### Backgammon



Everything you need to play the famous and deceptively simple board game. Board, stones, rolling dice and doubling dice are shown in full colour and high resolution. Choose from four levels of skill to suit experts and beginners alike – full rules are included.

### Space Raiders



Your skill is all that's stopping successive waves of aliens from destroying Earth. Use your gun base to attack. Shelter behind buildings... move out and blast the passing alien spaceship! Full-colour high-resolution graphics with sound.

### Planetoids



Dodge and swerve using your thrust button, turn on a planetoid... fire! But beware – the alien ship moves fast to destroy you with cluster bombs. And when it comes to the crunch, use your hyperspace button!

Full-colour high-resolution graphics with sound.

### Hungry Horace



Horace is forever being chased around the park by guards. He steals their lunch, eats pathway flowers and creates chaos in the park by ringing the alarm!

You'll have to be quick to keep Horace out of trouble!

Full-colour high-resolution graphics with sound.

### New! Tranz Am



Set in a future time ruled by cars and trophies, in a land where petrol replaces gold, and status is possession

of the 8 Great Cups of Ultimate. Driving your Super Blown Red Racer, use your skill to outwit and crash the Deadly Black Turbos. Use your instruments to locate and collect the trophies – before you overheat or run out of fuel.

A program with outstanding multi-directional movement, graphic features, and a playing area equivalent to more than 600 times actual screen area.

### Horace and the Spiders



Guide Horace on the hazardous journey to the cobwebbed house full of poisonous spiders.

Safely in the house, you must move along cobwebs, choose a spot... and jump on it! The spiders will be in a frenzy – scuttling to repair their precious web.

And when a spider is spinning a new section, you're safe to attack and destroy it!

Kill all the spiders, and a new web appears... with even more spiders to catch.

Full-colour high-resolution graphics.

### New! Cookie



You're Charlie the Chef, who keeps his ingredients locked in the larder. But if the ingredients escape, they

bring the inedible Nasties with them!

You must daze the escaping ingredients with flour bombs, and knock them into the mixing bowl. Stop them getting into the dustbin, at all costs! And beware of Nasties that get into the mixing bowl!

Cookie is fast-moving panic in the pantry, with a cast of real characters. A program to make you smile – and sweat!

### New! Jet Pac



As Chief Test Pilot of the Acme Interstellar Transport Company, your task is to deliver and assemble spaceship

kits. On your way round the galaxy, you're free to collect precious stones and gold.

The catch? Rocket fuel is precious and scarce. And the aliens don't take kindly to the theft of their valuables. You'll need your wits and your lasers!

With a host of features, including multi-directional movement, explosions, sound effects and one and two player option.

# ZX MICRODRIVE



## NOW ON RELEASE

The ZX Microdrive System – as you'd expect from Sinclair – is unique to the world of computing. It's a compact, expandable add-on system which provides high-speed access to massive data storage. With just one Microdrive alone (and Interface 1), you'll have at least 85K bytes of storage, the ability to LOAD and SAVE in mere seconds, the beginnings of a local area network of up to 64 Spectrums, and a built-in RS232 interface! The cost? Less than £50 for each Microdrive.

**How to get ZX Microdrive** Spectrum owners who bought direct from us, by mail order, have been

sent full details. Order forms are being mailed in strict rotation, so if you haven't yet received your order form please bear with us. We're making good progress in meeting the huge demand.

If you didn't buy your Spectrum by mail order, don't worry. Send us the form from the bottom of this page. We'll add your name to the mailing list, and send you details by return.

Each Microdrive costs £49.95. Interface 1 costs £49.95, but just £29.95 if purchased with a ZX Microdrive. Extra ZX Microdrive cartridges: £4.95.

### How to order

Simply fill in the relevant sections on the order form below. Note that there is no postage or packing to pay on some purchases. Orders may be sent FREEPOST (no stamp needed). Credit card holders may order by phone, calling 01-200 0200, 24 hours a day. 14-day money-back option, of course. Please allow 28 days for delivery.

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# sinclair®

Sinclair Research Ltd, Stanhope Road, Camberley, Surrey, GU15 3PS. Telephone: (0276) 685311.

To: Sinclair Research Ltd, FREEPOST, Camberley, Surrey, GU15 3BR.

ORDER FORM

#### Section A: Hardware

Qty	Item	Code	Item Price £	Total £
	ZX Interface 2	8501	19.95	
	ZX Spectrum – 48K	3000	129.95	
	ZX Spectrum – 16K	3002	99.95	
	Postage and packing: orders under £90	0028	2.95	
	orders over £90	0029	4.95	
			<b>TOTAL £</b>	

#### Section B: Software ROM CARTRIDGE PROGRAMS

	G12/R Planetoids	5302	14.95
	G9/R Space Raiders	5300	14.95
	G13/R Hungry Horace	5303	14.95
	G24/R Horace and the Spiders	5305	14.95
	G28/R PSSST	5307	14.95
	G30/R Cookie	5309	14.95
	G29/R Tranz Am	5308	14.95
	G27/R Jet Pac	5306	14.95
	G22/R Backgammon	5304	14.95
	G10/R Chess	5301	14.95

#### CASSETTE PROGRAMS for ZX Spectrum

E9/S	Chess Tutor 1	4308	9.95
E7/S	Musicmaster	4306	9.95
E8/S	Beyond BASIC	4307	9.95
E6/S	Make-a-Chip	4305	9.95
L5/S	Print Utilities	4404	9.95
			<b>TOTAL £</b>

\*I enclose a cheque/postal order made payable to Sinclair Research Ltd for £

\*Please charge to my Access/Barclaycard/Trustcard account no:

\*Delete/complete as applicable.

Signature

Mr/Mrs/Miss

Address

HCW 910  
(Please print)

## ZX Microdrive information request

Please add my name to the Microdrive Mailing List, and send me a colour brochure with full specifications of ZX Microdrive/Interface 1  (tick here). You can use the above form to send us your name and address.

# 'NOW WIN THE POOLS'

THIS IS MEANT FOR YOU — ESPECIALLY IF YOU USE A SINCLAIR ZX81 or SINCLAIR SPECTRUM COMPUTER, or even ANY COMPUTER.

HAVE YOU EVER HAD THAT DREAM OR EVER WISHED THAT YOU HAD "WON ON THE POOLS" — AT LAST YOU CAN TURN IT INTO REALITY.

THERE IS A SECRET OF "HOW TO WIN ON THE FOOTBALL POOLS" — IT CAN BE DONE. I DISCOVERED THE SECRET A LONG TIME AGO — NOW, FOR THE FIRST TIME I'M PREPARED TO SHARE IT WITH YOU.

HOW DOES THIS INTEREST YOU — I HAVE DOCUMENTARY EVIDENCE BY WAY OF POOLS WINNINGS DIVIDEND SLIPS/ CANCELLED CHEQUES, etc, SHOWING MY PRESENT WINS ON THE POOLS AS FOLLOWS:—

First Dividends	Second Dividends	Third Dividends	Fourth Dividends	Fifth Dividends	Sixth Dividends
765	1,818	2,942	1,952	631	93

A GRAND TOTAL OF 8,201 (EIGHT THOUSAND, TWO HUNDRED AND ONE DIVIDENDS — so far).

## I HOLD THE UNCHALLENGED WORLD'S RECORD FOR POOLS WINS

I AM MAKING THIS VERY SPECIAL, REDUCED PRICE OFFER TO READERS OF HOME COMPUTING WEEKLY FOR A LIMITED PERIOD ONLY.

Do not let anyone tell you that it is impossible to "WIN ON THE POOLS" — since I perfected my method, I HAVE WON REGULARLY for over TWENTY-FIVE YEARS — proof that it is no 'flash-in-the-pan'.

I have CHALLENGED THE WORLD with my record of wins and with all the evidence that I possess — NO ONE has ever been able to accept the Challenge — I KNOW NO ONE EVER WILL.

MY SECRET IS NOW PLACED ONTO COMPUTER CASSETTE FOR YOU.

THE METHOD IS THE GREATEST TREBLE CHANCE WINNER IN THE HISTORY OF FOOTBALL POOLS — IT WILL LAST FOREVER — BOTH FOR ENGLISH AND AUSTRALIAN FOOTBALL POOLS, WITH EQUAL SUCCESS.

I now intend to give a limited number of people the opportunity of making use of my method — perfected over 25 years and proving itself on EVERY ONE OF THOSE TWENTY-FIVE YEARS.

You will have noted details of my personal achievements so far, as given to you above.

A GRAND TOTAL of 8,201, yes 8,201 POOLS DIVIDENDS, including 765 FIRST DIVIDENDS.

My Pools Winnings Dividend slips now number so many, that they fill a very large suitcase and will stand as my evidence of all claims in ANY COURT OF LAW IN THE WHOLE WORLD.

Taking just the past 25 years into consideration, I have won ON AVERAGE over 328, (THREE HUNDRED AND TWENTY-EIGHT) Pools Dividends EVERY YEAR — or — AN AVERAGE of over SIX DIVIDENDS EVERY WEEK for TWENTY-FIVE YEARS.

You have my absolute Guarantee of the complete authenticity of every claim, cheque, document, letter, etc, contained herein.

Don't take my word for it, read what people write about me and my method:—

*I won on Zettlers last weekend. It was not a big sum, but all the same it was a very nice surprise for me.* J.C., Lancs.

*I appreciate the straightforward method you adopt, which is such a contrast to the rubbish of misrepresentation which is so common in the Betting World, by unscrupulous and self-opinionated charlatans.* C.H., Devon

*Winnings cheque received today, sincere thanks.* D.N., Devon

*I congratulate you on your achievement.* R.R., Wales

*I should like to thank you for a most exciting season and look forward to hearing from you again.* J.C., Hants.

*I would like to acknowledge cheque and say how much I appreciate your integrity.* J.M., Scotland

*Many thanks for your system, it is all you say and more.* J.C., Lancs.

*Your wonderful system won me £3,527. I intend to visit London soon and will be able to come and see you personally.* (Overseas Client). P.M., Kampala.

*Many thanks for trying so hard to please us all, your brother should be thanked also. One of our daughters, WHOSE HUSBAND YOU HELPED ENORMOUSLY, has just phoned, the four of them have just spent a lovely holiday in Spain.* K.R., Isle of Man.

I do have losing weeks, but ON AVERAGE my winnings show over SIX DIVIDENDS EVERY WEEK for the past 25 years.

I know that you are now utterly flabbergasted, it always happens to everyone with whom I come into contact. Please just sit back and imagine for a moment my FIRST DIVIDEND wins alone — they now number 765 (seven hundred and sixty-five) and will probably be even more by the time this advertisement appears in print.

I AM NUMBER ONE IN THE WORLD AND NO ONE DISPUTES IT.

For as long as I continue to enter the Football Pools my wins will continue. I have already said, they apply, with equal success to both English and Australian Football Seasons.

I intend to release a STRICTLY LIMITED NUMBER of copies of my cassette, (either for Sinclair ZX81 or Sinclair Spectrum) — DO NOT DELAY AND FIND YOU ARE TOO LATE, in which case I would have to refund your money.

I am so confident of YOUR success that if do not win at least THREE FIRST TREBLE CHANCE DIVIDENDS in the first 20 weeks of entering, I will completely cancel the balance of the purchase price and you do not have to pay me another penny, at any time, no matter how vast your winnings.

I only wish that space would allow me to give you photographs of my winnings slips, cancelled cheques, etc, but it is of course impossible — they now number 8,201 dividends. I have however given JUST A FEW EXTRACTS from ORIGINAL LETTERS I hold from my small Clientele.

I am the Inventor and Sole Proprietor of my method, Registered as EUREKA — ('I have found it'). I am known as The Professor in Pools Circles — I am of the Highest Rank in Forecasting — this is beyond dispute. I am marketing a limited number of Computer Cassettes, under my Registered Company — FOOTBALL ENTERPRISES.

My initial charge for a copy was £75, but for this SPECIAL REDUCED PRICE OFFER I will send you a copy, (for ZX81 or Spectrum) for £20, (twenty pounds) ONLY, plus your Promise to pay me the balance of £55 — ONLY IF YOU WIN AT LEAST THREE FIRST TREBLE CHANCE DIVIDENDS IN YOUR FIRST 20 WEEKS OF ENTERING — otherwise you owe me NOTHING FURTHER.

This is surely proof absolute of my supreme and utter confidence in my own abilities and in the capabilities of my discovery. I could easily CHARGE £2,000 per cassette on the evidence I possess, but that would not be fair to everyone, which is what I want to do.

My method is WORLD COPYRIGHT, any infringement and immediate proceedings will be taken, without prior warning. It is truly ingenious and has stood the test of time.

My cassette is simplicity itself to operate and you'll be given FULL DETAILS for weekly calculating. Your entry need not involve you in any large weekly stakes, you can enter for as little as 25p, if you wish.

I charge NO COMMISSION on any of your wins — no matter how BIG they may be.

I realised a long time ago, that it was no good sitting down and dreaming about winning the pools, so I burnt the candle at both ends, working late into the night, occasionally RIGHT THROUGH THE NIGHT, I KNEW there was a way, eventually it all paid off and has been doing so ever since.

I am unable to vary my offer to anyone, so please do not request it, as I shall very easily dispose of the cassettes I have prepared and am making available.

IMMEDIATELY I perfected my method I commenced winning right away, (first with just a little £163, the first week I used it), I HAVE NEVER LOOKED BACK SINCE, amongst all those dividends was one for over EIGHT THOUSAND POUNDS for just one eighth of a penny stake.

I will release a copy on cassette, to you, on receipt of the completed order form and your Signature thereon, confirming you will treat it in the STRICTEST CONFIDENCE between us and retain it for your OWN USE ONLY.

### PLEASE NOTE:

If you happen to be the proud owner of a Computer, other than a Sinclair ZX81 or Sinclair Spectrum, you can still purchase a copy of my method, for the same price and program it YOURSELF on to YOUR OWN COMPUTER.

*I sent in my FIRST entry last week and won 2nd and 3rd dividends, as you will see from the enclosed certificate. One more and I would have collected over £400 for FIRST dividend. Once I've won a fair amount I shall be staking from winnings and at 2p per line, A FIRST DIVIDEND last week at this would have been over £3,000.*

C.A., Yorks.

I am very interested indeed and enclose £20 herewith. I agree to pay you the balance of £55 ONLY if I win at least THREE FIRST TREBLE CHANCE DIVIDENDS in my first 20 weeks of entering — otherwise I owe you NOTHING FURTHER at any time — no matter how much money I win. My Signature below is my Undertaking to retain complete and absolute confidence about the method.

Name.....

Address.....

.....

.....

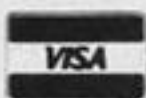
Signature ..... HCW33

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**Software Exchange.** Swap your used software. Free club membership. £1 per swap. sae for details UK SEC, (HCW), 15 Tunwell Greave, Sheffield, S5 9GB.

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★ **PROGRAMMERS:** Our Author-Members not only receive 70% of income from their published software, also there are many other benefits in joining us. Send us a copy of your latest work and tell us about yourself. (Any Popular Micro). Copyrights fully respected.

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## FOR HIRE

**To Hire a Computer from ZX81 upwards,** ring or write to: Business and Computer Services, 292 Caledonian Rd., N1 1AB. Tel: 01-607 0157.

**Oric Software Library.** Two weeks hire £1. Annual Membership £5. Stamp for list. Les Wilson, Penallick, Tintagel, Cornwall.

## SERVICES

### ALL YOUR CASSETTE NEEDS

Blank cassettes C15 with case, 40p each.  
Labels in Blue, White or Yellow, 20 for 36p. Inlay cards in Blue, Red or Yellow 20 for 60p. Library cases, 9p each.  
Postage on each complete order 55p.  
Stonehorn Ltd, (HCW), 59 Mayfield Way, Barwell, Leicester LE9 8BL.

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Send your faulty ZX81 for fast reliable repair. We will repair any ZX81 KIT or READY BUILT UNIT Only £15.95 fully guaranteed + p+p £1.75  
Please state the nature of problem. Send cheque or postal order to **NEXT COMPUTER SYSTEMS**, 89 HARVEST RD, (H.C.W) ENFIELD GREEN, SURREY TW20 0QR.

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**VIC-20 printer 1515 CTN unit,** 16K/8K RAMS, software paper, manuals. Tel: Portsmouth 738606 evenings £430.

## SOFTWARE APPLICATIONS

### VIC IMITATOR

Copies virtually all VIC-20 cassette based programs, including basic machine code, multipart programs and programs using various protection techniques. Written in machine code. Easy to use works on any memory size. For a quick delivery, send Cheques/POs for £6 to:

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IT CAN EVEN COPY ITSELF

**Sharp PC-1500,** Tandy PC-2 owners. Poolster is the only pools forecast program based on past scored draw numbers. 8K additional RAM required. Plot your own strategy, £9.99. Also available for Sinclair ZX81 16K. State family name of intended user. Also, Kronograf, A Clock/Timer/Stopwatch program, £5.99. Cheque/PO to Naigram Software, 18A Soho Square.

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Home and Business micro computers bought and sold. Apple equipment always required. Tel: 0344 84423.

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### LANTERN SOFTWARE TI99/4A

High quality arcade games and utilities inc., Troll King and Daddie's Hotrod. S.A.E. for details to: 4 Haffenden Road, Tenterden TN30 6QD.

### SPECTRUM PROGRAMS

Gnasher £4.95, Arcadian £4.95, Escape £4.95, Backgammon £5.95.

All 16K and many more. Crossed cheques/PO's to: VYAJYS HK or SAE. For full list to VYAJYS HK, 11 Margaret Avenue, St. Austell, Cornwall.

## SOFTWARE EDUCATIONAL

**ENGLISH MADE EASY on the TI-99/4A.** Help your child learn AND have fun. Our cassette software has been specially designed by an experienced teacher. For children of junior age, or older children needing remedial help. Colour graphics and lower case characters. Helpful literature included. PERPLEXING PLURALS, RIDDLING RHYMES, SCINTILLATING SYNONYMS, AGONISING ANTONYMS. £4.50 each. £8.50 for 2. £12.00 for 3. £15.00 for 4. **WASHBROOKE EDUCATIONAL SOFTWARE**, 9 Sweet Close, Deeping St. James, PETERBOROUGH PE6 8QW.

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Exchange your Unwanted Software  
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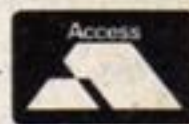
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